CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. 5-00-134

WASTE DISCHARGE REQUIREMENTS FOR COUNTY OF YOLO PLANNING AND PUBLIC WORKS DEPARTMENT YOLO COUNTY CENTRAL LANDFILL CLASS III LANDFILLS & CLASS II SURFACE IMPOUNDMENTS YOLO COUNTY

The California Regional Water Quality Control Board, Central Valley Region, (hereafter Board) finds that:

1. The County of Yolo, Planning and Public Works Department, (hereafter Discharger) owns and operates the Yolo County Central Landfill, a Class III municipal solid waste (MSW) disposal facility with Class II surface impoundments. On 1 February 2000, the Discharger submitted a Joint Technical Document describing significant changes to the facility, including the addition of new leachate surface impoundments and a proposal for a new bioreactor demonstration project. Existing Waste Discharge Requirements (WDRs) Order No. 96-223 therefore no longer adequately describe the discharge.

2. The landfill is about four miles northeast of Davis and three miles southeast of Woodland, near the intersection of Roads 28H and 104 in Yolo County. The site covers 725 acres in Sections 29 and 30, T9N, R3E, MDB&M, corresponding to Assessor's Parcel Numbers (APNs) 042-004-001, 042-004-002, and 042-014-006. See Attachment A: Location Map, a part of this Order.

3. The landfill has been in operation since 1975, servicing the incorporated and unincorporated areas of Yolo County. The landfill accepts solid wastes classified as "inert" and "nonhazardous" under Sections 20220 and 20230, Title 27 of the California Code of Regulations (Title 27). Approximately 160,000 tons per year is disposed at the site.

4. The waste disposal facilities include six Class III landfills, four Class II surface impoundments, and a bioreactor demonstration project. An additional Class III landfill has been approved for future construction.

5. The six existing landfills are designated Waste Management Units (WMUs) 1 through 6. Of these, WMUs 1 through 5 have been inactive since 1992, but have not yet been brought to final grade for closure. WMU 6, the only active landfill, consists of four waste disposal modules (A, B, C, and D) each covering about 22 acres. Of these modules, A through C are at or near capacity, while Module D is new. There is also a small-scale bioreactor demonstration project at Module B. At build-out, four additional modules will be constructed at WMU 6 (E through H) and eight additional modules (I through P) at WMU 7. The new modules will be constructed about one every two to three years, depending on waste disposal needs.

6. The Class II surface impoundments are WMUs G and H. WMU G was constructed in 1995 and has a capacity of 1.5 million gallons. WMU H, completed in 1999, consists of three Class II surface impoundments (H1, H2, and H3), as shown in Attachment B: Site Map, a part of this Order. H3, the large pond, covers five-acres and has a capacity of 10 million gallons. H1 and H2 each cover 2.5 acres each and have a capacity of 3 million gallons each. All three surface impoundments at WMU H are hydraulically connected by overflow weirs and piping to form one WMU. WMU F, a surface impoundment described in previous WDRs, has been decommissioned and converted into a geosynthetic-lined water storage pond.

7. As a follow-up to the pilot bioreactor project at Module B, the Discharger is now proposing a full scale bioreactor demonstration project to be constructed and operated in Module D. The first phase of the project will consist of two bioreactors, one aerobic and the other anaerobic, to be constructed in the 12-acre portion of Module D already completed. Each bioreactor cell will be up to six acres, as shown in Attachment B: Site Map. The design and operations of these cells is described in Finding Nos. 28, 29 and 42.

WASTES AND THEIR CLASSIFICATION

8. The Discharger proposes to continue to accept and landfill solid wastes classified as "inert" or "nonhazardous" under Title 27, including household, commercial, industrial, and special wastes. The special wastes include grit and screening wastes from the City of Davis and City of Woodland Wastewater Treatment Plants (WTPs) and alternative daily cover materials consisting of chopped green waste and geosynthetic blankets covers. The Discharger does not propose to accept solid wastes defined as "hazardous" or "designated" under Title 27, and these WDRs contain a prohibition against the disposal of such wastes.

9. The discharger proposes to discharge liquid wastes classified as "nonhazardous" or "designated" to the surface impoundments, including landfill leachate, gas condensate and cooling water from the power plant, private septage, chemical toilet waste, and water treatment lime sludge. The Discharger does not propose to accept liquid wastes defined as "hazardous" under Title 27, and these WDRs contain a prohibition against the disposal of such wastes.

10. Wastes discharged to the pilot bioreactor cells at Module B included non-hazardous household and commercial wastes. While these wastes were intended to be representative of typical landfill loads, inert wastes were excluded, and green waste was used instead of soil as alternative daily cover. The Discharger now proposes to discharge the same types of wastes to the full scale bioreactor project to be conducted at Module D.

SITE DESCRIPTION

11. The area topography is generally flat with a natural grade of approximately one foot of fall from north to south and six feet of fall from west to east. The northwestern corner of the site is approximately 25 feet above mean sea level (MSL) and the maximum final landfill elevation is about 80 feet MSL.

12. The site is bounded by cropland to the north, open fields to the west (used for spray disposal of cannery wastewater), City of Davis WTP ponds and wastewater reclamation fields to the east, and the Willow Slough Bypass Channel along the southern boundary. On the other side of the Willow Slough Bypass Channel is additional agricultural cropland.

13. There are 57 private wells within one mile of the site, including at least 38 used for irrigation, 17 for domestic supply, and 2 for livestock. Numerous additional domestic and irrigation wells are located further from the site.

SITE GEOLOGY

14. The soils underlying the site predominantly consist of low-permeability silty clays (90 to 100 percent passing the number 200 sieve). Test borings also show an interval of laterally discontinuous silty fine sands up to 12 feet thick between 6 and 35 feet below ground surface (bgs). This interval is known as the Upper Sand. Materials below 35 feet bgs are mostly clays, interspersed with minor amounts of inter-bedded sand and gravel, to a depth of about 80 feet bgs. More abundant coarse-grained material is encountered below 80 feet bgs. Due to the discontinuities, neither the Upper nor Lower Sands have been reliably correlated from well to well.

15. There are no known active faults traversing or projected through the site. The principal seismic impact would be strong ground shaking generated by movement on one or more of the faults in the western Sierra foothill fault system, the San Andreas fault system, and the blind thrust faults of the Sierran Block/Coast Range boundary, including the Vacaville /Winters seismic region, and the Dunnigan fault. The maximum peak ground surface acceleration estimated to occur at the site is on the order of 0.32 gravity (g). The fault nearest the site is the Dunnigan fault about 11 miles northwest of the facility.

SURFACE WATER

16. Nearby surface waters include Willow Slough Bypass on the southern property boundary, Willow Slough about 2 miles to the north, Putah Creek approximately 4 miles to the south, Cache Creek approximately 6 miles to the north, and the Yolo Bypass (an overflow conveyance of the Sacramento River) 3 miles to the east. The Willow Slough Bypass Channel drains the southern part of the site and an unnamed canal drains the northern part of the site. The unnamed canal empties into the Yolo Bypass to the east.

17. The site is in the Lower Putah Creek Hydrologic Area of the Valley Putah-Cache Hydrologic Unit in the Sacramento Hydrologic Basin Planning Area (as depicted on the interagency hydrologic maps prepared by the Department of Water Resources in August 1986). The beneficial uses of the surface waters in this area are municipal and domestic supply, agriculture, recreation, fresh water habitat (warm), spawning (warm), and wildlife habitat.

18. The landfill does not impact any jurisdictional waters of the United States (ie. reservoirs, vernal pools and wetlands).

STORM WATER

19. The facility receives an average of 17.4 inches of precipitation per year as measured at Davis between the years 1917 and 1998. About 90 percent of annual precipitation occurs between the months of November and April. The mean evaporation for this facility is 87.1 inches per year as measured at Davis between the years 1970 and 1998. Based on these data, average annual net evaporation at the facility is 69.7 inches.

20. The 100-year wet season precipitation for the facility is 30.7 inches and the 100–year, 24-hour precipitation event is 4.26 inches. The 100-year, 24-hour precipitation event is based on California Department of Water Resources (DWR) precipitation records (1976).

21. On the latest Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map for Yolo County, dated May 17, 1988, the site is identified as within Zone B, "areas protected from the 100-year flood by levee, dike, or other structures subject to possible failure or overtopping during larger floods".

GROUNDWATER

22. The groundwater table beneath the site is naturally high and is additionally elevated from crop irrigation, spray disposal, and wastewater reclamation activities on adjacent lands. The water table ranges seasonally between four and 15 feet below ground surface (bgs), corresponding to 19 and eight feet MSL. In addition, a capillary rise up to three feet has been measured. A deeper aquifer underlies the shallow at about 80 feet bgs (-57 feet MSL).

23. The natural gradient of the shallow ground water is to the south and southeast, but is reversed by operation of the extraction wells (these wells pump continuously year-round). Under pumping conditions, the shallow gradient is to the north/northwest. The gradient is also influenced by the wastewater reclamation and irrigation activities on surrounding lands.

24. The beneficial uses of the shallow ground water are municipal and domestic supply, industrial service supply, and industrial process supply. The beneficial uses of deep ground water are municipal and domestic supply, agricultural supply, industrial service supply, and industrial process supply.

CORRECTIVE ACTION

25. Ground water on the western part of the site has been impacted by volatile organic compounds (VOCs) from one or more of the older landfill units (WMUs 1 through 5). After installation of an air stripper unit in 1993, the Discharger began ground water pump and treat using existing de-watering wells. NPDES Order No. CA0083119 (WDR Order No. 98-197) regulates the discharge to an unnamed irrigation canal on the northern perimeter of the site. VOCs recently detected in the source area at OW-27 include cis-1,2 dichloroethene (up to 30 µg/l), 1,1-dichlorethane (up to 2.2 µg/l), tetrachloroethene (up to 3.9 µg/l), trichloroethene (up to 2.9 µg/l) and vinyl chloride (up to 3.0 µg/l). Since 1993, concentrations of total dissolved VOCs at OW-27 have declined from 52.8 to 44.5 µg/l.

WMU DESIGN

26. The as-built containment systems for the landfills and surface impoundments at the facility are summarized in the following table:

TABLE I

WMU	Year Built / Size	WMU Base Liner Design	Design	WMU Status
			Siting	
1	1975 16 Acres	subgrade sloped for leachate drainage to perimeter trench	Ch 15 (unlined)	inactive
2	1977 47.5 Acres	subgrade sloped for leachate drainage to perimeter trench	Ch 15 (unlined)	inactive
3	1981 20 Acres	subgrade sloped for leachate drainage to perimeter trench	Ch 15 (unlined)	inactive
4	1983 9 Acres	subgrade sloped for leachate drainage to perimeter trench	Ch 15 (unlined)	inactive
5	1988 30.5 Acres	Operations layer (one foot of soil) Dendritic LCRS - lateral trenches containing gravel & perforated pipe draining via longitudinal trenches and a trunk line to a pump station. Two feet of compacted clay ($k \leq 1 \times 10^{-6}$ cm/sec)	Ch 15 prescriptive liner pump gw 5' separation	inactive
6A	1991 22 Acres	Operations layer (one foot of soil) Blanket type LCRS –geonet draining via longitudinal trenches to perimeter trunk line[1]	Subtitle D prescriptive liner[1]	inactive

WMU	Year Built / Size	WMU Base Liner Design	Design Siting	WMU Status
		60-mil HDPE liner Two feet of compacted clay ($k \leq 1 \times 10^{-7}$ cm/sec)	EAD 3' separation	
6B	1993 22 Acres	Operations layer – one foot of soil Geotextile cushion Blanket type LCRS –geonet draining via longitudinal trenches to perimeter trunk line[1] 60-mil HDPE liner 1.72 to 2.54 feet of compacted clay ($k \leq 1 \times 10^{-8}$ cm/sec)	Subtitle D prescriptive liner[1] EAD 3' separation	active
6C	1996 22 Acres	Operations layer – one foot of soil Geotextile cushion Blanket type LCRS –geonet draining via longitudinal trenches to perimeter trunk line[1] 60-mil HDPE liner Two feet of compacted clay ($k \leq 1 \times 10^{-7}$ cm/sec) Three feet earthfill 40-mil HDPE liner (capillary break)	Subtitle D prescriptive liner[1] EAD[2] 5' separation	active
6D[3] Phase 1	1999 12 acres	Same as Module C except: Operations layer – three feet of shredded tires ($k \geq 1$ cm/sec) Cushion layer – six inches of pea gravel[4] Blanket LCRS - geotextile bonded to both sides of geonet, drains via longitudinal trenches to interior sumps[1]	Same as Module C[1]	active
G	1995 2.5 acres 1.5 MG	Southern half lined inside with compacted concrete, halves separated by concrete wall Primary liner - 60-mil HDPE geomembrane ($k \leq 1 \times 10^{-7}$ cm/sec) Blanket LCRS – geonet, drains via longitudinal trenches to interior sumps Secondary liner - 40-mil HDPE geomembrane Two feet of compacted clay ($k \leq 1 \times 10^{-7}$ cm/sec) One to three feet earthfill, 40-mil HDPE geomembrane (to function as a capillary break)	Exceeds T27 prescriptive EAD 5' separation	active

WMU	Year Built / Size	WMU Base Liner Design	Design Siting	WMU Status
H	H1 & H2 2.5 acres 3 MG H3 5 acres 10 MG	Same as WMU G except no concrete lining or interior walls. All three impoundments hydraulically connected by overflow weirs and pipes over sides which allow pumping from one to the other	Same as WMU G	active

1. LCRS trenches and sump areas have double-composite liner
2. Minimum separation reduced to three feet in LCRS trench and sump areas per EAD.
3. Module D, Phase 2 and future modules E through H will have same design as Module D, Phase 1.
4. Board staff may approve of other materials in lieu of pea gravel upon a demonstration by Discharger that they are adequately protective.

27. Leachate from the unlined modules and WMU 5 is conveyed via trunkline to Pump Station No.1, while leachate from WMU 6, Modules A, B, and C is conveyed to Pump Station No. 2. Liquid from each surface impoundment's LCRS is returned to that impoundment.

Bioreactors

28. The base liner of the proposed aerobic and anaerobic bioreactor cells at Module D will be that module's base liner and side-slopes summarized in Table I. The cells will be constructed with compacted clay perimeter levees around the cell base. Low-permeability wall between the aerobic and anaerobic cells will be constructed as required for cell isolation.

29. During waste placement, instrumentation will be placed at various levels within the bioreactor cells to monitor process conditions, including temperature sensors, moisture sensors, and pressure transducers. The pressure transducers measure hydrostatic head on the LCRS. Multi-port water injection and gas recovery systems will also be placed at various levels within the waste. Leachate from the two WMU 6, Module D, Phase 1 sumps will be either pumped directly to WMU H or re-circulated in WMU 6D.

WMU SITING

30. Section 20240 (c) of Title 27 requires that new landfills, waste piles and surface impoundments be "sited, designed, constructed and operated", to ensure or maintain at least five feet of separation between the contained wastes and the highest anticipated level of the groundwater table. Existing WMUs are to be "operated" to maintain the required separation. WMUs 1, 2, 3, and 4 are "existing units" under Title 27.

31. Ground water elevation monitoring indicates that during periods of high ground water there is inadequate separation between ground water and the landfill units. In siting WMU 5 (in 1988), the Discharger installed a slurry wall and a line of extraction wells along the northwest perimeter of the site to help reduce the water table to maintain the required separation. The trench for the wall was excavated to an elevation of about 15 feet below MSL. The discharger has since been operating these de-watering wells to maintain a minimum five feet of separation.

32. In siting WMU 6, the Board (in previous requirements) approved an EAD for Modules A and B, which reduced the required amount of separation to three feet, as measured from ground water to the base of the 60 mil HDPE primary liner. The engineered alternative design recognized the composite liner design, slurry wall, and de-watering system, as "engineered structures" for the purpose of ensuring that there is adequate separation from wastes and that an upward hydraulic head does not occur on the bottom of the liner. The Discharger agreed to continue de-watering as necessary to meet the operating requirements of Section 20240 (c) of Title 27. The EAD approved for the remaining WMU 6 modules and the surface impoundments, however, required installation of a capillary break and five feet of separation. The siting designs for all the WMUs are summarized in Table I.

33. In approving these engineered alternative designs, the Board found that the Discharger made the demonstration required by Section 20080(b) of Title 27, namely that construction of the prescriptive standard is unreasonably or unnecessarily burdensome and will cost substantially more than an EAD, and that there is a specific EAD that is consistent with both the performance goal and the prescriptive standard which affords equivalent protection against water quality impairment.

OPERATION OF FACILITIES

34. Refuse is placed in the landfill by compacting lifts approximately 2 feet thick until a total lift thickness of about 14 feet is obtained. A 6-inch thick layer of clean soil is then placed over the refuse as daily cover and compacted at the end of each day and up to 12-inches of intermediate cover is placed over the top and external side slopes of the cell. Alternative daily covers with a maximum exposure time of 7 days are used on the internal side slopes. Final landfill contours at closure will reach elevations of about 80 feet MSL.

35. Expansion will be accomplished by the addition of new Class III landfill units in the area east of the existing WMUs. The landfill will be developed by extending the road north of the surface impoundments out to the east. The landfill units will extend to within approximately 100 feet of the property boundary.

36. The Discharger proposes to use alternative daily and interim cover due to soil deficiencies at the facility. The type of products and material to be considered as alternative cover include but are not limited to commercially available foams, spray-ons, and geosynthetics, as well as indigenous materials, such as ash based materials, sludge, chipped green waste, compost, and shredded tires

as discussed in EPA Document 600/R-93/172. Each material to be used will be approved before use by the appropriate regulatory agencies and the Board's Executive Officer. In addition to daily cover or ADC applied where there is active waste filling, interim cover will be applied to areas of the landfill where filling is not anticipated within 180 days. Landfill areas that are not used for more than 30 days during the wet season, running from 1 November to 31 March, will have a minimum of one foot of interim cover placed on them.

37. The bioreactors at Module D will be operated as they are filled and instrumented. Prior to the start of liquid injection, the bioreactor cells will be covered by an interim low-permeability cover (geomembrane or clay) to inhibit the uncontrolled inflow and outflow of liquids and gases from the cell surface. ADC materials will be placed over the surface and external side slopes underneath the interim cover materials to facilitate liquid and air injection and gas extraction during bioreactor operation.

38. To control and recover landfill gas (LFG), the Discharger has installed a gas extraction system and has been extracting LFG since 1985. The LFG is piped to an onsite power plant, which burns the gas to generate electricity. The gas extraction system and cogeneration plant are owned and operated by a third party contractor, which sells the power in the private market.

39. During evaporation operations, the large surface impoundment (H3) will be operated at a constant level, and any excess will be pumped into the smaller storage ponds. During the wet season, the large pond will also be used for leachate storage. These WDRs require the Discharger to prepare and submit an updated maintenance and operations plan (MOP) for the surface impoundments at the facility.

40. Section 28 of Subtitle D (40 CFR 258.28) prohibits the discharge of "bulk or non-containerized liquid waste" in an MSW landfill unless:

    a. The waste is household waste other than septic waste; or
    b. The waste is leachate or gas condensate from an MSW landfill with a composite liner and LCRS (the Discharger must place this demonstration in the operating record)

    As part of approval of the proposed Module D bioreactor, the federal Environmental Protection Agency (EPA) is considering a project-specific waiver of these restrictions to allow for the addition of supplemental liquids to the bioreactor. These WDRs contain a discharge prohibition against the addition of supplemental liquids to any bioreactor at the facility absent such a waiver.

41. Subject to federal Subtitle D regulations, Title 27 includes the following regulations regarding the discharge of liquids to a landfill:

    A. Section 20340 (g) requires that leachate be returned to the same WMU or to another authorized disposal facility. This section also allows leachate to be discharged to a different WMU provided that:
        (i) The receiving unit has an LCRS, at least the same classification as the originating unit, and contains wastes of similar classification and characteristics as those in the originating unit; and

(ii) The discharge is approved by the Regional Board; and
(iii) The discharge does not exceed the moisture-holding capacity of the receiving unit, and complies with Title 27, Section 20200(d).

B. Under Section 20200(d)(3), liquids and semi-solid wastes (other than de-water sewage sludge) may not be discharged to a Class III landfill unless the Discharger can demonstrate that the discharge will not exceed the moisture-holding capacity of the landfill.

These WDRs contain a discharge specification prohibiting the discharge of leachate and/or supplemental liquids into a landfill WMU in excess of its moisture holding capacity.

42. At start-up, supplemental liquids will be added to each bioreactor at Module D in order to achieve optimum moisture levels for biological activity. Air will also be injected into the aerobic bioreactor. The planned rate of liquid addition in the proposed anaerobic bioreactor will be 10 gpm per 10,000 square feet (44 gpm per acre), the same rate as for the pilot cell. Based on results from the pilot cell, it is anticipated that the peak leachate production rate will be about 20 gpm per acre over the six-acre cell area (ie. 47% of the peak injection rate). The liquid addition at the aerobic bioreactor at Module D will be at a rate three to four times higher than that for the anaerobic cell due to evaporation losses from air injection.

CLOSURE

WMUs 1 Through 5

43. WMUs 1 through 5 have been inactive since 1992, but were never closed and must therefore comply with Subtitle D. The units have two to four feet of intermediate cover and have settled about three feet since 1992.

44. The Discharger has submitted a partial final closure plan (FCP) for WMUs 1 through 5, which proposes phased closure beginning with WMU 3. Under the plan, intermediate cover will be removed in areas where additional fill is needed, and wastes will then be discharged to reach final grade. There will be no lateral expansions of any of the units. Soil will then be re-applied and engineered as foundation layer for final cover. Approximately 1,850,000 cubic yards of wastes will be discharged to reach final grade and the maximum final waste elevation will be 76.0 feet MSL.

45. The final cover designs for the top deck and sides slopes of WMUs 1 through 5 will be as follows:

- Erosion-resistant/vegetative cover layer – One foot vegetative cover soil
- low hydraulic conductivity/infiltration layer - one-foot of compacted clay ($k \leq 1 \times 10^{-6}$ cm/sec)

- foundation layer - two-feet of compacted soil or existing intermediate cover

The proposed design is prescriptive under Title 27 but is an EAD to the prescriptive standard of Subtitle D, which requires that the infiltration layer be at least 18 inches thick. ($k \leq 1 \times 10^{-5}$ cm/sec). The Discharger has demonstrated, however, that the proposed Title 27 design is more stringent than Subtitle D, given that the maximum hydraulic conductivity of the proposed infiltration layer will one-tenth of the maximum allowed under Subtitle D. Further, the vegetative cover layer will be six inches thicker than that required under Subtitle D, providing additional protection from infiltration.

46. The top deck of WMUs 1 through 5 will be sloped at 3% for adequate drainage. Perimeter slopes will be no greater than 3:1 (horizontal-to-vertical). Since it is anticipated that the side-slopes will span less than 50 feet of vertical from the base of each unit, the closure plan does not include benching.

47. As an alternative to closure-in-place, the Discharger is considering clean closure of one or more of these units, and in the Summer, 2000 will be conducting a pilot project to evaluate the feasibility of waste mining. These requirements include a provision requiring submission of a Clean-Closure Plan and cost estimates for this option.

WMUs 6 and 7

48. The Discharger has submitted a Preliminary Closure and Post-Closure Maintenance Plan (PCPMP) for WMUs 6 and 7. As with WMUs 1 through 5, closures of modules in WMUs 6 and 7 will be implemented in phases as the modules are filled and allowed to settle.

49. The final cover design for the top deck and sides slopes of WMUs 6 and 7 will be as follows:
    - Erosion-resistant/Vegetative Cover layer:
      One foot vegetative cover soil
    - Low hydraulic conductivity/Infiltration layer:
      geocomposite drainage layer (geonet bonded to geotextile)
      40-mil low density polyethylene liner (LDPE)
      geosynthetic clay liner ($k \leq 1 \times 10^{-8}$ cm/sec)
    - Foundation layer - two-feet of compacted soil or existing intermediate cover

The use of GCL in lieu of compacted clay represents an EAD to the prescriptive standards of Title 27 and of Subtitle D for a low hydraulic conductivity/infiltration layer, which require that the permeability of the low conductivity/infiltration layer be no greater than that of the base liner (T27, Section 21090(a)(2), Subtitle D, Section 258.60(a)(1)). The proposed geosynthetic cap ensures that the permeability of the cap will be no greater than that of the Subtitle D composite base liner. Pursuant to Section 20080(b) of Title 27, the Discharger has demonstrated that construction of the prescriptive standard is unreasonably or unnecessarily burdensome and will

cost substantially more than the proposed EAD. The Discharger has also demonstrated that the proposed EAD is consistent with both the performance goals and the prescriptive standards of Title 27 and affords equivalent protection against water quality impairment.

50. The top deck of WMUs 6 and 7 will be sloped at 3% for adequate drainage. Perimeter slopes will be no greater than 3:1 (horizontal-to-vertical). Designing and constructing 15-foot wide benches will achieve erosion control and access at least every 50 vertical feet, as required under Section 21090 of Title 27. The maximum elevation upon closure will be 80 feet MSL, approximately 60 feet above surrounding (undisturbed) grade.

Bioreactors

51. Upon completion of the pilot bioreactor project at Module B, the project will be de-commissioned and wastes discharged to final elevation for closure of Module B. The bioreactor will then be incorporated and closed with the remainder of Module B in accordance with the cover design specified in Finding No. 49 and preliminary closure plan and schedule (see Table V).

52. The full-scale bioreactors at Module D will receive final cover within five years of reaching final elevation, in accordance with Closure Specification No. 9, the cover design specified in Finding No. 49, and the preliminary closure plan and schedule for Module D (see Table V).

Surface Impoundments

53. When no longer needed to retain landfill leachate, surface impoundments will be de-commissioned and clean-closed per Title 27, Section 21400. One or more impoundments may remain in operation as others are closed. As part of de-commissioning, the impoundments will first be cleaned in accordance with the Maintenance and Operations Plan (MOP). Any remaining liquids will be either pumped out of the impoundment or allowed to evaporate. Pumped liquids will either be discharged to a remaining impoundment or to tanks for offsite disposal at an authorized facility. Residual sludges/solids will also be removed and discharged to an authorized onsite unit or offsite facility. The containment system will then be inspected and removed in accordance with Title 27.

FINANCIAL ASSURANCES

54. The financial assurance mechanism consists of an enterprise fund for closure and 18% of the postclosure maintenance. The remainder is provided under the local government financial test. Monies are paid into the fund annually as waste is discharged to the landfill. Currently, the trust fund contains $5.2 million.

55. The estimated closure costs for the facility are as follows:

Table II

WMU	Closure Cost Estimates [1]					
	Closure	Post-Closure Maintenance [2]		Post-Closure Monitoring [2]		Total
	($M)	Annual ($K)	30-Years ($M)	Annual ($K)	30 Years ($M)	($M)
1 - 5	9.2	26.7	0.8	110	3.3	13.3
6	16.2	90	2.7	63.3	1.9	20.8
7	16.2	90	2.7	63.3	1.9	20.8
G[3]	---	---	---	---	---	---
H[3]	---	---	---	---	---	---

1. 1996 estimates in 1999 dollars using the inflation factors determined by the CIWMB.
2. Excludes costs of corrective action-related post-closure maintenance and monitoring.
3. Closure costs not yet estimated for surface impoundments. Estimates to be included in revised preliminary closure plan per Provision No. 11.

56. There is currently no separate financial assurance mechanism for funding corrective action costs for a known or reasonably foreseeable release. Costs for post-closure maintenance and monitoring related to the existing release are included in the amounts funded for closure of WMUs 1 through 5 (but are not included in the closure/post-closure estimates above). The provisions of these WDRs therefore require submission of revised estimates for corrective action funding and a demonstration as to the mechanism and amount. The costs and estimated costs of corrective action for the facility are as follows:

Table III

WMU	Known Release ($K) [1]		Reasonably Forseeable Release ($K) [1]			
	Maintenance [2]	Monitoring [2]	Additional Facilities	Maintenance	Monitoring	Total
1 - 5	580	860	n/a	n/a	n/a	n/a
6	n/a	n/a	160[3]	580[3]	860[3]	1,600[3]
7	n/a	n/a				
G[4]	n/a	n/a	---	---	---	---
H[4]	n/a	n/a	---	---	---	---
Total:			160	580	860	1,600

1. 1996 estimates in 1999 dollars using the inflation factors determined by the CIWMB.
2. Includes air stripper maintenance, effluent monitoring and ground water corrective action monitoring.
3. Combined estimate for both units based on existing release. Revised estimates to be submitted per Provision No. 13.
4. Reasonably foreseeable release estimates not yet developed for surface impoundments. Revised estimates to be submitted per Provision No. 15.

CEQA

57. In October 1992, the Yolo County Board of Supervisors approved a final environmental impact report (EIR) for addressing impacts associated with the then existing landfill and construction of WMUs G, 6 and 7. On 6 June 1999, the Board of Supervisors further approved a negative

declaration for the three surface impoundments comprising WMU H, and in June 2000 approved a negative declaration for the full-scale bioreactor project proposed for WMU 6, Module D. Board staff has considered these documents, including the negative declaration for the bioreactor project, in preparation of these WDRs.

OTHER LEGAL REFERENCES

58. This order implements:

    a) *The Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, Fourth Edition*;
    b) The prescriptive standards and performance goals of Chapters 1 through 7, Subdivision 1, Division 2, Title 27, of the CCR, effective 18 July 1997, and subsequent revisions;
    c) The prescriptive standards and performance criteria of RCRA Subtitle D, Part 258;
    d) State Water Resources Control Board Resolution No. 93-62, *Policy for Regulation of Discharges of Municipal Solid Waste*, adopted 17 June 1993.

PROCEDURAL REQUIREMENTS

59. All local agencies with jurisdiction to regulate land use, solid waste disposal, air pollution, and to protect public health have approved the use of this site for the discharges of waste to land stated herein.

60. The Board has notified the Discharger and interested agencies and persons of its intention to revise the WDRs for this facility.

61. In a public hearing, the Board heard and considered all comments pertaining to this facility and discharge.

IT IS HEREBY ORDERED that Order No. 96-223 is rescinded, and it is further ordered that the County of Yolo, Department of Public Works and its agents, assigns and successors, in order to meet the provisions of Division 7 of the California Water Code and the regulations adopted thereunder, shall comply with the following:

A. Discharge Prohibitions

Landfills

1. The discharge of solid wastes defined as "hazardous " or "designated" to any landfill unit is prohibited. For the purposes of this Order, the terms "hazardous" "designated" and "nonhazardous" are as defined in Title 27.

2. The discharge of solid waste outside of a landfill WMU is prohibited.

3. The discharge of waste to either a new landfill unit, or to a lateral expansion of an existing landfill unit is prohibited, unless the new unit or expansion area is equipped with a containment system which meets prescriptive standards of Title 27 and Subtitle D (through Resolution 93-62), or a Board-approved EAD described in these WDRs.

4. The discharge of wastes to WMUs 1, 2, 3, or 4, or any other inactive landfill unit or module is prohibited, except to the extent necessary to bring that unit or module to final grade for closure.

5. With the following exceptions, the discharge of liquid wastes or semi-solid waste (i.e., waste containing less than 50 percent solids) to landfill WMUs is prohibited:

   a. Landfill leachate may be discharged to the bioreactor cells at Modules B and D
   b. Supplemental liquids (listed in Discharge Specification No. 7 herein) may be injected into the bioreactor cells at Modules B and D, provided that the Discharger obtains a waiver of the Subtitle D restrictions on liquid additions (see Finding No. 40).
   c. De-watered sewage or water treatment sludge, as provided in Section 20220(c) of Title 27, may be discharged to any active landfill modules with composite liners.

6. The discharge of solid waste containing free liquid or moisture in excess of the waste's moisture holding capacity to any landfill module is prohibited.

7. The disposal of containerized liquids at this facility is prohibited.

8. The disposal of wastes containing greater than one percent (>1%) friable asbestos is prohibited.

9. The disposal of shredded automobile bodies, household appliances and recyclable sheet metal at this facility is prohibited.

Surface Impoundments

10. The discharge of hazardous wastes to any surface impoundment is prohibited.

11. With the exception of the discharges listed in Discharge Prohibition A.5, the discharge of liquid wastes or semi-solid waste (i.e., waste containing less than 50 percent solids) outside of a Class II surface impoundment is prohibited.

12. Except for semi-solid wastes and solids that settle from the impounded liquid, the discharge of solid wastes to any surface impoundment is prohibited.

13. The discharge of waste to ponded water from any source, except Class II surface impoundments, is prohibited.

Other

14. The discharge of waste within 50 feet of surface waters is prohibited.

15. The discharge of solid or liquid waste or leachate to surface waters, surface water drainage courses, or groundwater is prohibited.

16. The discharge of wastes which have the potential to reduce or impair the integrity of containment structures or which, if commingled with other wastes in the unit, could produce violent reaction, heat or pressure, fire or explosion, toxic by-products, or reaction products which in turn:

    a. require a higher level of containment than provided by the unit,
    b. are "restricted hazardous wastes", or
    c. impair the integrity of containment structures,

    is prohibited.

17. The discharge of landfill or surface impoundment wastes to the storm water sedimentation basin is prohibited.

B. Discharge Specifications

1. The treatment, storage, or disposal of wastes shall not cause pollution or a nuisance, as defined in the California Water Code, Section 13050.

2. The discharge of wastes shall not cause water quality degradation by allowing an exceedence of concentration limits or a statistically significant increase over background concentrations per the detection monitoring methodologies of Monitoring and Reporting Program No. 5-00-134.

3. Wastes shall only be discharged into, and shall be confined to, WMUs specifically designed for their containment.

4. The discharge of wastes to unlined WMUs 1, 2, 3, or 4, to bring those units to final grade, shall be limited to dry season operations.

5. Pursuant to Title 27, Sections 20200(d) and 20340 (g), the amount of leachate and/or supplemental liquids injected into any bioreactor cell shall not exceed the "moisture holding capacity" of the waste mass, as defined in Title 27. The generation of leachate in the LCRS during liquid injections shall not be construed as violating this specification, provided that

leachate continues to be absorbed into the waste mass in significant quantities and that the rate of liquid injection is adjusted as practicable to minimize excessive leachate production. The moisture holding capacity (also referred to as "field capacity") of the bioreactor shall be construed as the point where, under sustained (ie. steady-state) conditions, leachate is no longer being absorbed into the waste mass in significant quantities, as evidenced by the rate of leachate production being about the same as the liquid injection rate.

6. Pursuant to Section 20340 (g) of Title 27 (see Finding No. 41), landfill leachate may be discharged to a Class II surface impoundment. However, leachate destined for a bioreactor cell shall not be commingled with, and shall be stored separately from, other designated wastes

7. Liquids discharged to a bioreactor cell shall be limited to leachate generated from WMU 6 and supplemental liquids necessary to reach and/or maintain the bioreactor at field capacity. Supplemental liquid additions shall be limited to the following:

   a. Leachate from other landfill WMUs
   b. Leachate stored in the surface impoundments
   c. Other non-hazardous liquids from the surface impoundments
   d. Landfill gas condensate
   e. Extracted groundwater
   f. Supply water

8. Leachate and supplemental liquids that may be discharged to a bioreactor during the active life of a module (per Discharge Prohibition No. 5) may be discharged to that bioreactor during the post-closure period, with Board staff approval, per Section 21090(a)(5) of Title 27.

C. Facility Specifications

Landfills

1. With the following exceptions, a minimum separation of 5 feet shall be maintained between wastes (or leachate) and the highest anticipated elevation of underlying groundwater, including the capillary fringe:

   a. A minimum of three feet of separation shall be maintained between the primary liner and high ground water, including the capillary fringe, at WMU 6, Modules A and B, per the EAD described in Finding No. 32 and Table 1 herein.
   b. A minimum of three feet of separation shall be maintained between the primary liner and installed capillary break at the LCRS trenches and sumps for WMU 6, Modules C and D, per the EAD described in Table 1 herein. A minimum of five feet shall be maintained between the primary liner and an installed capillary break at the remainder

of WMU 6, Modules C and D, per the EAD described in Finding No. 32 and Table 1 herein.

c. A minimum of five feet of separation shall be maintained between the primary liner and installed capillary break at future modules to be constructed in WMUs 6 and 7, per the EAD described in Finding No. 32.

2. Each new landfill module in WMU 6 and future landfill units shall have a composite liner design which meets the prescriptive containment requirements of Title 27 and Subtitle D (through Resolution 93-62), or the approved engineered alternative described in Table 1. The composite liner shall be overlain by a geotextile and a minimum of one foot of protective soil or an approved alternative layer, such as shredded tires, as approved by the Board's Executive Officer.

3. Each landfill unit shall have a blanket-type LCRS immediately above the liner, which is designed and operated to prevent the development of hydraulic head on the liner.

4. Prior to the beginning of construction for each phase of a new landfill liner or cover, a Final Design Report shall be submitted to the Board for review and approval, and shall include, but not be limited to, the engineered design plans for the WMU and a construction quality assurance (CQA) plan to verify that construction specifications will be met, and a revised water quality monitoring plan. Approval of the final design report shall be obtained from Board staff prior to starting construction.

5. Prior to the discharge of waste to any new landfill unit or module, the Discharger shall submit a final construction report for approval by Board staff. The report shall include, but not be limited to a completion report, as-built plans and drawings, and a CQA report. The CQA report shall include a written summary of the CQA program, all test results, analyses, copies of the inspector's original field notes, and a certification as described in the Standard Provisions and Reporting Requirements.

6. Interim cover shall be applied to areas of the landfill where filling is not anticipated within 180 days. Interim cover shall consist of two feet of compacted clay soil or an approved EAD.

7. Precipitation and drainage control systems shall be constructed on both active and closure WMUs. They shall be designed and constructed to accommodate the anticipated volume of precipitation and peak flows from surface runoff under 100-year, 24-hour precipitation conditions contained in the Standard Provisions and Reporting Requirements referenced in Provision D.2 below.

8. Annually, prior to the anticipated rainy season but no later than **15 November**, any necessary erosion control measures shall be implemented, and any necessary construction,

maintenance, or repairs of precipitation and drainage control facilities shall be completed to prevent erosion or flooding of the facility and to prevent surface drainage from contacting or percolating through wastes. By **1 October of each year**, the Discharger shall submit to the Board a Winterization Plan describing measures planned to prepare the site and conduct operations during the wet season. By **1 December of the same year**, the Discharger shall submit an Annual Winterization Report (AWR) to the Regional Board describing implementation of the Winterization Plan and measures taken to comply with this specification. The AWR may be included in the Annual Report submitted under Monitoring and Reporting Program No. 5-00-134.

9. New landfill units, existing landfill units, and lateral expansions thereof, shall not be located in the 100-year floodplain of any surface water unless the Discharger has successfully completed, and the Board has approved, all demonstrations required for such discharge under Subtitle D (40 CFR 258.11).

10. Within 90 days of the adoption of this Order, the Discharger shall submit, for approval by Board staff, a Bioreactor Maintenance and Operations Plan (MOP) for the Module D bioreactors at the facility. The Bioreactor MOP should outline strategies and methods for leachate re-circulation, supplemental liquid injection, and achieving moisture holding capacity. The Bioreactor MOP shall also include calculations regarding expected leachate production levels and a response plan in the event leachate production levels exceed expected levels, maximum levels prescribed in Facility Specification No. 11, and levels that threaten to violate Facility Specification Nos. 18 or 19.

11. The hydraulic head on the Module D bioreactors liner shall not exceed four inches. If LCRS monitoring indicates that the hydraulic head on the liner exceeds this value, the Discharger shall immediately adjust the liquid injection rate, check the sump pumps for proper operation, and implement other appropriate measures to reduce the head, as set forth in the Bioreactor MOP. If the hydraulic head on the liner exceeds 10 inches, the Discharger shall immediately (1) notify the Board, (2) cease the discharge of liquids to the unit, and (3) implement any other necessary corrective measures to reduce the head to four inches or less.

Surface Impoundments

12. Per the EAD described in Finding No. 32 and Table 1, a minimum of minimum of five feet of separation shall be maintained between the secondary liner and installed capillary break at all surface impoundments.

13. Within 90 days of the adoption of this Order, the Discharger shall submit, for approval by Board staff, an updated maintenance and operations plan (MOP) for the surface impoundments. The Surface Impoundment MOP shall outline strategies and methods for evaporating leachate, minimizing vectors and odors, managing pond levels, conducting liner inspections, cleaning the ponds and other relevant information. The plan shall include

calculations as to the amount of leachate expected to be generated in and pumped from the LCRS back into the impoundment under normal operations in the absence of a liner failure. The plan shall identify the failure criteria of the upper liner and include a response plan in the event of an upper liner failure.

14. Solids which accumulate in the surface impoundments shall be removed as necessary to maintain minimum freeboard requirements and sufficient capacity for leachate storage and disposal. Prior to removal of these solids, sufficient samples shall be taken for their characterization and classification pursuant to Article 2, Subchapter 2, Chapter 3, Division 2 of Title 27. The rationale for the sampling protocol used, the results of this sampling, and a rationale for classification of the solids shall be included in the Surface Impoundment MOP.

15. Liquid collected in the surface impoundment's LCRS shall not exceed design requirements. If the amount of liquid generated exceeds the failure criteria of the primary liner, then the Discharger shall immediately cease discharges to the leaking surface impoundment, and shall notify the Board in writing within seven days. Notification shall include a timetable for remedial action to repair the upper liner to the impoundment or other action necessary to reduce leakage production as set forth the Surface Impoundment MOP.

All WMUs

16. All WMU containment structures shall meet the general criteria set forth in Section 20320 of Title 27.

17. WMU containment structures shall be designed and constructed under the direct supervision of a California registered civil engineer, or a certified engineering geologist, and shall be certified by that individual as meeting the prescriptive standards (except where exempt or approved as an engineered alternative design herein) and performance goals of Title 27 prior to waste discharge.

18. LCRSs shall be designed, constructed, and maintained to be free-draining and to prevent the buildup of hydraulic head on the underlying liner at any time. The LCRS should be sized to collect twice the anticipated daily volume of leachate generated at the landfill or surface impoundment. LCRS sump pumps shall be installed in the sump at or above the minimum level necessary for proper operation. Prior to the discharge of wastes to any new landfill module, the LCRSs and sump pumps shall be tested for capacity and proper operation (the results of these tests shall be reported to the Board in the Final CQA Report).

19. Leachate generation by a landfill unit or surface impoundment shall not exceed 85% of the design capacity of the LCRS or sump pump, and the depth of the fluid in any LCRS sump shall be kept at the minimum level needed for safe pump operation. If leachate generation exceeds 85% of the design capacity, or if the depth of fluid in the sump is too high, then the

Discharger shall immediately cease the discharge of sludge and other high-moisture wastes to the landfill unit and shall notify the Board in writing within seven days. Notification shall include a timetable for corrective action necessary to reduce leachate production.

20. The Discharger shall provide engineered structures or drainage systems to insure upward hydraulic head due to high ground water does not occur on any new WMU liner. Where a synthetic liner is used for a capillary break, it shall be installed in the upper portion of the capillary fringe to minimize the potential for upward hydraulic head on the capillary break. The construction of new WMUs shall include a monitoring network to determine ground water elevations and whether upward hydraulic head due to high ground water occurs on any new WMU liner or capillary break. If the Discharger or Board determines through analyses of monitoring data that upward hydraulic head has occurred on the liner or capillary break, the Discharger shall submit a revised Report of Waste Discharge within 180 days which specifies the method by which upward hydraulic head on the liner due to high ground water will be prevented and a time schedule for remedial action.

21. Prior to the discharge of waste to a WMU, all wells within 500 feet of the WMU shall have sanitary seals, which meet the requirements of the Yolo County Health Department or shall be properly abandoned. A record of the sealing and/or abandonment of such wells shall be sent to the Board and to the State Department of Water Resources.

WMU Closure Specifications

WMUs 1 Through 5

22. WMUs 1 through 5 shall receive a final cover in accordance with the prescriptive standards of Title 27 and Subtitle D, or the EAD described in Finding No. 45.

23. The low hydraulic conductivity layer for WMUs 1 through 4 shall have a maximum hydraulic conductivity of 1×10^{-6} cm/sec and a minimum relative compaction of 90%. The low hydraulic conductivity layer for WMU 5 shall have a maximum hydraulic conductivity of 1×10^{-6} cm/sec, or equal to the permeability of the underlying clay liner, whichever is less. Hydraulic conductivities of cap materials shall be determined by laboratory tests using water.

24. The closure schedule for WMUs 1 through 5 shall be as follows:

Table IV

	WMUs				
Tasks	**1**	**2**	**3**	**4**	**5**
Reach final waste elevation	2004 – 2005	2006 – 2009	2001 - 2003	2010 - 2010	2011 – 2011
Install foundation soil and grade	2004 – 2005	2006 – 2009	2001 - 2003	2010 – 2010	2011 – 2011

	WMUs				
Tasks	**1**	**2**	**3**	**4**	**5**
Install low hydraulic conductivity/infiltration layer	2005 – 2006	2007 – 2010	2002 - 2004	2011 – 2011	2012 – 2015
Install erosion-resistant/vegetative cover layer	2005 – 2006	2007 - 2010	2002 - 2004	2011 - 2011	2012 – 2015
Complete closure	2006	2010	2004	2011	2015

WMUs 6 and 7

25. WMU 6 shall be incrementally closed in accordance with the partial FCP. Each module shall receive a final cover in accordance with the prescriptive standards of Title 27 and Subtitle D, or the EAD described in Finding No. 49.

26. The incremental closure schedule for WMU 6 shall be as follows:

Table V

	WMU 6 Modules [1, 2]				
Tasks	**A**	**B** [3]	**C**	**D**[3]	**E-H**
Reach final waste elevation	2004 – 2005	2005 – 2006	2006 – 2007	2007 – 2008	2009 – 2018
Install foundation soil and grade	2004 – 2005	2005 – 2006	2006 – 2007	2007 – 2008	2009 – 2018
Install low hydraulic conductivity/infiltration layer [4]	2005 – 2006	2006 – 2007	2007 – 2008	2008 – 2009	2010 – 2019
Install erosion-resistant/vegetative cover layer	2005 – 2006	2006 – 2007	2007 – 2008	2008 – 2009	2010 – 2019
Complete closure	2006	2007	2008	2009	2020

1. Updated estimates for WMU 6 to be submitted in revised PCPCMP per Provision No. 11
2. Closure dates for WMU 7 to be submitted in revised PCPCMP per Provision No. 11.
3. Includes de-commissioning and closure of bioreactors.
4. Includes engineered alternative design as described in Finding No. 49.

All Landfill WMUs

27. The WMU slopes shall not exceed a horizontal-to-vertical ratio of 1.75:1, and shall have at least one 15-foot wide bench for every 50 feet of exterior side-slope rise. WMU closure designs for side-slopes steeper than 3 : 1, or having a geosynthetic component, shall be supported by a Slope and Foundation Stability Report (SFSR), prepared by a registered civil engineer or certified engineering geologist per Section 21750(f)(5) of Title 27 and approved by Board staff. Other areas with slopes greater than ten percent, surface drainage courses, and areas subject to erosion by wind or water shall be designed and constructed to prevent such erosion. The SFRS may be included in the FCP and/or the design report for closure of each landfill or landfill module.

28. Vegetation shall be planted and maintained over each closed landfill module. Vegetation shall be selected to require a minimum of irrigation and maintenance and shall have a rooting depth not in excess of the vegetative layer thickness.

29. The landfill final slopes shall not be less than three percent grade to prevent ponding and infiltration.

30. Except where significant settlement is anticipated, closure should be completed at each WMU as soon as possible after reaching final grade. In no event shall the waiting period for settlement exceed five years after reaching final grade.

Surface Impoundments

31. The closure of each surface impoundment shall be under the direct supervision of a California registered civil engineer or certified engineering geologist.

32. At closure of surface impoundments, all residual wastes, including liquids, sludges, precipitates, settled solids, and liner materials and adjacent natural geologic materials contaminated by wastes, shall be completely removed and discharged to a waste management unit approved by Board staff. If after reasonable attempts, the Discharger demonstrates the removal of all remaining contamination is infeasible, the impoundment shall be closed as a landfill.

D. RECEIVING WATER LIMITATIONS

The concentrations of Constituents of Concern, passing the Points of Compliance shall not exceed the Concentration Limits in the "Water Quality Protection Standard" established pursuant to Monitoring and Reporting Program (MRP) No. 5-00-134, which is attached to and made part of this Order.

E. PROVISIONS

1. The Discharger shall comply with these WDRs and the attached MRP No. 5-00-134. A violation of the MRP is a violation of these waste discharge requirements. The Discharger shall further comply with all applicable provisions of Title 27 and Subtitle D not specifically referred to in this Order.

2. The Discharger shall comply with the Standard Provisions and Reporting Requirements, dated August 1997, which are hereby incorporated into this Order. A violation of any of the Standard Provisions and Reporting Requirements is a violation of these waste discharge requirements.

3. The Discharger shall maintain waste containment facilities and precipitation and drainage control systems throughout the post-closure maintenance period, and shall immediately notify the Board of any flooding equipment failure, slope failure, or other change in site conditions which could impair the integrity of waste or leachate containment facilities or of precipitation and drainage control structures.

4. The Discharger shall continue to monitor each WMU and all underlying media per MRP No. 5-00-134 throughout the post-closure maintenance period, and shall continue until the Board determines that the wastes remaining at the site no longer threaten water quality.

5. The Discharger shall have the continuing responsibility to assure protection of usable waters from discharged wastes, including leachate that may be generated and discharged during the closure, and post-closure maintenance period of the facility and during subsequent use of the property for other purposes.

6. The Discharger shall maintain legible records of the volume and type of each waste discharged for each landfill module and the manner and location of discharge. Such records shall be maintained at the facility or the facility's administration office until the beginning of the post-closure maintenance period. These records shall be available for review by representatives of the Board and of the State Water Resources Control Board at any time during normal business hours. At the beginning of the post-closure maintenance period for each of the landfill areas, copies of these records shall be sent to the Regional Board.

7. The Discharger shall provide proof to the Board **within sixty days after completing final closure** that the deed to the landfill facility property, or some other instrument that is normally examined during title search, has been modified to include, in perpetuity, a notation to any potential purchaser of the property stating that:

   a. the parcel has been used as a municipal solid waste landfill;

   b. land use options for the parcel are restricted in accordance with the post-closure land uses set forth in the post-closure plan and in WDRs for the landfill; and

c. in the event that the Discharger defaults on carrying out either the post-closure maintenance plan or any corrective action needed to address a release, then the responsibility for carrying out such work falls to the property owner.

8. The Discharger or persons employed by the Discharger shall comply with all notice and reporting requirements of the State Department of Water Resources with regard to the construction, alteration, destruction, or abandonment of all monitoring wells used for compliance with this Order or with MRP No. 5-00-134, as required by Sections 13750 through 13755 of the California Water Code.

9. In the event of any change in ownership of this waste management facility, the Discharger shall notify the succeeding owner or operator in writing of the existence of this Order prior to the change in ownership. A copy of that notification shall be sent to the Board.

10. **Within six months** of the adoption of this Order, the Discharger shall submit a revised FCP for WMUs 1 through 5, which includes an updated closure schedule and any plans for clean closure of these landfills.

11. **Within 90 days** of the adoption of this Order, and as necessary thereafter, the Discharger shall submit to the Board an updated preliminary closure and post-closure maintenance plan, prepared in accordance with Section 21769 of Title 27. The plan shall include conceptual designs for closing all landfill modules, bioreactors and surface impoundments. The plan shall further include all information necessary for Board staff review and approval of financial assurance cost estimates for closure and post-closure maintenance of each landfill submitted to the California Integrated Waste Management Board (CIWMB), pursuant to Sections 20950(f), and 22205 et seq. of Title 27.

12. The Discharger shall, **by 30 April of each year**, submit for approval by the Executive Officer, a demonstration of assurances of financial responsibility to ensure closure and post-closure maintenance of the waste management units in accordance with its approved closure and post-closure maintenance plan. The discharger shall provide the assurances of financial responsibility to the California Integrated Waste Management Board as required by Title 27 CCR, Division 2, Subdivision 1, Chapter 6. The assurances of financial responsibility shall provide that funds for closure and post-closure maintenance of the surface impoundments and the landfill units with respect to water quality shall be available to the Regional Board upon the issuance of any order under California Water Code, Division 7, Chapter 5. The Discharger shall adjust the cost annually to account for inflation and any changes in facility design, construction, or operation.

13. The Discharger shall, by **30 April of each year**, submit for approval by the Executive Officer, plans with detailed cost estimates and a demonstration of separate (ie. apart from closure and post-closure maintenance) assurances of financial responsibility for initiating and

completing corrective action for all known and reasonably foreseeable releases from the waste management units. The Discharger shall provide the assurances of financial responsibility to the California Integrated Waste Management Board as required by Title 27 CCR, Division 2, Subdivision 1, Chapter 6. The assurances of financial responsibility shall provide that funds for corrective action for all WMUs shall be available to the Regional Board upon the issuance of any order under California Water Code, Division 7, Chapter 5. The Discharger shall adjust the cost annually to account for inflation and any changes in facility design, construction, or operation.

14. In the event the Regional Board determines that the County of Yolo has failed or is failing to perform corrective action as required by law, the California Integrated Waste Management Board may direct the County of Yolo to pay from the pledged revenue such amounts as necessary to ensure sufficient corrective action. The County of Yolo shall be obligated to use such funds for corrective action in accordance with the directives of the Regional Board.

15. If at any time the Executive Officer determines that the bioreactor demonstration project at Module D is not in compliance with these WDRs, the Executive Officer may order immediate cessation of the project.

16. A copy of this Order shall be kept at the discharge facility for reference by operating personnel. Key operating personnel shall be familiar with its contents.

17. The Board will review this Order periodically and will revise these requirements when necessary.

If, in the opinion of the Executive Officer, the Discharger fails to comply with the provisions of this order, the Executive Officer may apply to the Attorney General for judicial enforcement or issue a complaint for Administrative Civil Liability.

I, GARY M. CARLTON, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 16 June 2000.

GARY M. CARLTON, Executive Officer

JDM:dlk

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. 5-00-134
FOR
YOLO COUNTY CENTRAL LANDFILL
CLASS III LANDFILLS
CLASS II SURFACE IMPOUNDMENTS
YOLO COUNTY

The Discharger shall maintain water quality monitoring systems that are appropriate for detection monitoring and corrective action, and that comply with Subchapter 3, Chapter 3, Subdivision 1, Division 2, Title 27, CCR, and any other applicable provisions therein.

Compliance with this Monitoring and Reporting Program, and with the companion Standard Provisions and Reporting Requirements, is ordered by Waste Discharge Requirements (WDRs) Order No. --. Failure to comply with this Program, or with the Standard Provisions and Reporting Requirements, constitutes non-compliance with the WDRs and with Division 7 of the Water Code, which can result in the imposition of civil monetary liability.

I. REPORTING

The Discharger shall report monitoring data and information as required in this Monitoring and Reporting Program and as required in the Standard Provisions and Reporting Requirements. Reports that do not comply with the required format will be rejected and the Discharger shall be deemed to be in noncompliance with the WDRs.

A narrative discussion of the monitoring results, including notations of any water quality violations shall precede tabular summaries of the water quality data. Further, each monitoring report shall include a summary and certification of completion of all Standard Observations for the waste management unit (WMU), for the perimeter of the WMU, and for the receiving waters. The standard observations shall be performed on a weekly basis and shall include those elements as defined in the Standard Provisions and Reporting Requirements.

In reporting the monitoring data required by this program, the Discharger shall arrange the data in tabular form so that the date, the constituents, the concentrations, and the units are readily discernible. The data shall be summarized in such a manner so as to illustrate clearly the compliance with waste discharge requirements or the lack thereof. Historical and current monitoring data shall be graphed at least once annually. Graphs for the same constituent shall be plotted at the same scale to facilitate visual comparison of monitoring data. Method detection limits and practical quantitation limits shall be reported. All peaks shall be reported, including those that cannot be quantified and/or specifically identified. Metals shall be analyzed according to the method listed in Attachments E and F.

The results of any monitoring done more frequently than required at the locations specified herein shall be reported to the Board in the monitoring report(s) for that period.

A. MONITORING REPORTS

1. Monitoring Reports

Monitoring Reports shall be prepared and submitted to the Board by the 30th day of the month following the end of each calendar semester (**30 July and 30 January**). The reports shall include the results of all monitoring programs listed herein.

2. Annual Report

An Annual Report, which summarizes the monitoring results for the prior year, shall be submitted to the Board by **30 January** each year. The Discharger shall submit the Annual Report as specified in the Standard Provisions and Reporting Requirements. The report shall contain both tabular and graphical summaries of the detection and corrective action monitoring data and a discussion of the progress toward re-establishment of compliance with WDRs and the Water Quality Protection Standard (WQPS). In reporting the progress of corrective action, the report shall include contaminant contour maps for representative volatile organic compounds and inorganic constituents and compare the current plumes with those prior to the start of corrective action. The Annual Report shall be jointly submitted with the second semester Detection Monitoring Report.

3. Constituents-of-Concern (COC) Report

The Discharger shall submit reports of the results of ground water monitoring for the Constituents of Concern (COC) every 5 years, or more frequently if required. The ground water monitoring for COC Report shall alternate between the Fall and Spring seasons. The results of COC monitoring shall be submitted with, or reported in, the Annual Report for that year.

B. OTHER REPORTS

1. Water Quality Protection Standard Report

Any changes to the water quality protection standard are to be included in the Annual Report.

2. Notification of Release and Re-test

For any WMU, if the results of a detection monitoring program (DMP) shows that there is a measurably significant increase in an indicator parameter or waste constituents over the WQPS at or beyond the points of compliance (i.e., measurably significant evidence of an exceedence or release), the Discharger shall:

a. immediately notify the Regional Board by telephone or fax of the exceedence,
b. within seven days of the initial findings, follow up with written notification by certified mail (or acknowledgment of the Board's finding),

c. within 30 days of the initial finding, re-sample for the constituent(s) or parameter(s) at the point where the standard was exceeded, and
d. within 60 days of the initial finding, submit the results of the re-sampling and statistical analysis, indicating whether or not an exceedence or release was confirmed by the re-test.

3. New Release - Amended Programs

Upon verifying a measurably significant evidence of a release from a WMU according to Section 20420(j) of Title 27 and Section A.6 of this MRP, the Discharger shall follow the procedures and timeline set forth in the Standard Provisions and in Sections 20420(k) and 20425 of Title 27.

4. Existing Release

Within 30 days upon confirmation of an exceedence from an existing release, the Discharger shall submit for Board staff approval an amendment to the Corrective Action Program, describing measures planned or taken to contain the release and further corrective action. The Discharger shall also note any necessary changes to the DMP and Corrective Action Monitoring Program monitoring locations as a result of the exceedence (see Section IV.B herein).

C. STANDARD OBSERVATIONS

Each monitoring report shall include a summary and certification of completion of all Standard Observations for the waste management unit, for the perimeter of the WMU, and for the receiving waters. The standard observations shall be performed on a weekly basis and shall include those elements as defined in the Standard Provisions and Reporting Requirements.

II. MONITORING PROGRAMS

A. SOLID WASTE MONITORING

The Discharger shall monitor and report all wastes discharged to each WMU on a monthly basis as follows:

Table II.A.1: Nonhazardous Solid Waste Monitoring

Parameter	Units	Reporting Frequency
Source(s) of material discharged		Semi-annually
Minimum discharge elevation	MSL feet & tenths	Semi-annually
Results of Load Checking Program	---	Semi-annually
Quantity discharged	Cubic yards or tons	Semi-annually
Type of material discharged	---	Semi-annually
Capacity of landfill/module remaining	Percent	Annually

Table II.A.2: Liquid and Semi-solid Waste Monitoring

The Discharger shall monitor all wastes discharged to the Class II surface impoundments on a daily basis and report to the Board as follows:

Parameter	Units	Reporting Frequency
Quantity discharged	gallons, cubic yards or tons	Semi-annually
Type of liquid discharged	---	Semi-annually
Capacity remaining	Percent/gallons	Semi-annually
Source of material discharged	---	Semi-annually
Minimum freeboard	Feet & tenths	Semi-annually

B. CONSTITUENTS OF CONCERN

Except as otherwise indicated in this Order, the Discharger shall monitor each media of each new and existing landfill module for applicable Constituents of Concern (per Subtitle D/State Water Resources Control Board Resolution 93-62). The monitoring locations, analytical methods, and frequency of analysis are as follows:

1. Monitoring Locations

a. Leachate – As specified in Table II.C.1

b. Unsaturated zone

i) pore fluid - lysimeters for monitoring each WMU, as identified in Table III.B.

c. Groundwater - all monitoring wells screened in each location as follows:

i) each aquifer zone (shallow and deep) down gradient of each WMU or contiguous landfill WMUs

ii) upgradient background wells for each WMU or WMU group

2. Monitoring Schedule

TABLE II.B.1
CONSTITUENTS OF CONCERN MONITORING

Constituents of Concern[1]	Units	Frequency
Carbonate	mg/l	Every 5 years[2]
Inorganics (dissolved)	mg/l	Every 5 years[2]
Volatile Organic Compounds (EPA Method 8260)	µg/l	Every 5 years[2]
Semi-Volatile Organic Compounds (EPA Method 8270)	µg/l	Every 5 years[2]
Organochlorine Pesticides (EPA Method 8081A)	µg/l	Every 5 years[2]
PCBs (EPA Method 8082)	µg/l	Every 5 years[2]
Chlorophenoxy Herbicides (EPA Method 8151)	µg/l	Every 5 years[2]
Organophosphorus Pesticides (EPA Method 8141A)	µg/l	Every 5 years[2]

1. The constituent-by-constituent listings for each of the above groups are included in Attachment F which accompanies this Order.
2. Except for leachate which shall be monitored for COCs annually (see Table II.C.2).

C. LEACHATE MONITORING

1. Monitoring Locations

The leachate monitoring locations shall be as follows:

TABLE II.C.1: LEACHATE MONITORING LOCATIONS

WMU	Module	Impoundment	Monitoring Location
1, 2, 3, 4, 5	---	---	LPS1
6	A, B, C	---	LPS2
6	D	---	Sumps 6DW, 6DE
6	D - bioreactors		Pressure transducers[1]
G	---	G	WMUG-LD
H	---	H1, H2, H3	WMUH1-LD, WMUH2-LD, WMUH3E-LD, WMUH3W-LD

1. Includes pressure transducers in LCRS trenches and on geocomposite drainage layer.

2. Monitoring Schedule

Leachate monitoring shall be conducted as specified in Table II.C.2.

TABLE II.C.2
LEACHATE MONITORING PROGRAM [1]
(ALSO USE FOR UNSATURATED ZONE MONITORING)

Parameter	Units	Frequency
Field Parameters		
Flow Rate [2]	Gallons/day	Monthly
Volume	Gallons	Monthly
Specific Conductance	µmhos/cm	Monthly
pH	pH units	Monthly
Hydraulic head [3]	ft	continuously
Monitoring Parameters		
Ammonia, as N	mg/l	Semi-annually
Bicarbonate	mg/l	Semi-annually
Chlorides	mg/l	Semi-annually
Nitrate	mg/l	Semi-annually
Sulfates	mg/l	Semi-annually
Total Alkalinity	mg/l	Semi-annually
Total Kjeldahl Nitrogen	mg/l	Semi-annually
Total Dissolved Solids (TDS)	mg/l	Semi-annually
Inorganics (dissolved)	mg/l	Annually
Volatile Organic Compounds	µg/l	Semi-annually
Constituents of Concern		
Table II.B.1 constituents	µg/l	Annually

1. The constituent-by-constituent listings for each of the above groups are included in Attachments E and F, which accompany this Order.
2. Leachate monitoring only.
3. Module D bioreactors only.

Upon detection of leachate in a previously dry sump or pump station, the leachate shall be sampled in accordance with the above schedule and the results included in the monitoring report

All visible portions of synthetic liners shall be inspected on a monthly basis. If, during the active life of the impoundment, the wastes are removed and the impoundment is cleaned down to the liner, an inspection shall be made of the bottom liner prior to refilling of the impoundment.

Each landfill and surface impoundment LCRS shall be hydraulically tested annually to demonstrate that it is still operating in conformance with the WDRs (i.e., no clogging, collapse, or reduced drainage capacity). The results shall be reported to the Board in the annual report and include comparison with earlier tests made under comparable conditions.

D. GROUNDWATER ELEVATION MONITORING

The ground water surface elevation (in feet and hundredths, MSL) in all wells and piezometers shall be measured on a quarterly basis and used to determine the velocity and direction of ground

water flow. Groundwater elevations taken prior to purging the well and sampling for Monitoring Parameters may be used to fulfill this requirement. Groundwater elevations for all upgradient and downgradient wells for a given groundwater body shall be measured within a period of time short enough to avoid temporal variations in groundwater flow which could preclude accurate determination of groundwater gradient and direction. This information shall be included in the semi-annual monitoring reports. The results of ground water elevation monitoring shall be displayed on a water table contour map and/or ground water flow net for the site and submitted with the semi-annual monitoring reports.

III. DETECTION MONITORING

A. GENERAL

The Discharger shall perform Detection Monitoring on all media potentially affected by a release, including surface water, groundwater, and the unsaturated zone. For any given monitored medium, a sufficient number of samples shall be taken from all Monitoring Points and Background Monitoring Points to satisfy the data analysis requirements for a given Reporting Period, and shall be taken in a manner that ensures sample independence to the greatest extent feasible.

The Discharger shall use a Board-approved statistical (or non-statistical) procedure to determine whether there has been a measurably significant increase in a constituent over the water quality protection standard, as set forth in Section 20415(e)(7) of Title 27.

B. UNSATURATED ZONE

Unsaturated zone monitoring devices shall be checked monthly for fluid and monitoring shall include the volume of fluid recovered. The monitoring locations shall be as follows:

1. Monitoring Locations

WMUs 1 through 6A were constructed before 1992 and do not have unsaturated zone monitoring. Further, WMUs 1 through 5 are in corrective action. The unsaturated zone monitoring for the remaining WMUs consists of pan and vacuum lysimeters placed in the subgrade of each landfill unit and surface impoundment. The unsaturated zone monitoring points shall be as listed in Tables III.B below (and as shown in Attachment C):

Table III.B
Unsaturated Zone Monitoring Locations

WMU	Lysimeter
6A	---
6B[1]	B-LYS-N, B-LYS –S
pilot cell (enhanced)	CEC-LYS
6C[2]	C-LYS-N, C-LYS –S
6D[3]	D-LYS-E, D-LYS –W
G[4]	G-LYS–1, 2, and 3
H-1[4]	H1-LYS-W
H-2[4]	H2-LYS-E
H-3[4]	H3-LYS–E and LYS–W

1. Module B has geocomposite strip drains underneath the northern and southern LCRS trenches (which connect directly to the trunk line on the eastern perimeter of the module). The strip drains direct flow to separate pan lysimeter manholes on the eastern side of the module (north and south half). The northern pan lysimeter manhole also services the strip drains under the two LCRS trenches for the pilot bioreactor cells.
2. Module C has vacuum lysimeters above the capillary break on the northern and southern half. The vacuum lysimeters are accessed by riser pipe which extends up the slope of the perimeter berm.
3. Module D has geocomposite strip drains underneath the leachate conveyance lines which drain from north to south. Pan lysimeters have been installed under the LCRS sumps on the southern perimeter of the module.
4. Vacuum lysimeters were installed underneath the sumps of each surface impoundment and are accessed by riser pipe which extends up the slope of the perimeter berms.

If liquid is detected in a lysimeter that has always been dry, a sample shall be collected immediately and analyzed for the monitoring parameters listed in Table II.C.2. Lysimeters shall constitute the "points of compliance" with respect to soil-pore liquid.

2. Monitoring Schedule

The monitoring schedule for unsaturated zone monitoring shall be the same as that for leachate monitoring (Table II.C.2).

C. GROUNDWATER

1. Monitoring Locations

WMUs 1 through 5 are in corrective action. The groundwater detection monitoring points for WMUs 6, G and H, shown in Attachment D, are as follows:

TABLE III.C.1
Ground Water Detection Monitoring Locations

WMU	Aquifer	Monitoring Method [4]	Background	Detection [1]
6 A [2]	shallow	Interwell	OW10, LTPZ-A,	EW10, EW-16 [3]
B	shallow	Interwell	LTPZ-B, OW10	EW10, EW-16 [3]
C	shallow	Interwell	LTPZ-C, OW15	EW10, EW-16 [3]
D	shallow	Interwell	LTPZ-D, OW14, OW23	EW10, EW-16 [3]
G	shallow	Interwell	SIMW1, OW17	SIMW4
H	shallow	Interwell	SIMW5, OW14, OW17	OW23, SIMW4

1. Gradient created by line of extraction wells used for detection monitoring
2. All four modules (A, B, C, and D) are contiguous
3. Wells used for de-watering only (not part of corrective action system).
4. Refers to primary method used in statistical analysis. Intrawell method may be also be used to supplement interwell analysis. A change to intrawell comparisons as the primary method requires an adequate demonstration and approval of the Executive Officer.

The natural gradient cannot be used as the reference gradient for detection monitoring purposes because the WMUs are within the influence of the extraction system. The gradient created by the extraction system, which runs from southeast to northwest, is therefore used instead.

2. **Monitoring Schedule** - The analytes and frequency of groundwater monitoring is as follows:

TABLE III.C.2
GROUNDWATER MONITORING PROGRAM [1]

Parameter	Units	Frequency
Field Parameters		
Temperature	°C	Semi-annually
Groundwater Elevation	Feet & hundreths, MSL	Semi-annually
Turbidity	turbidity units	Semi-annually
Specific Conductance	µmhos/cm	Semi-annually
pH	pH units	Semi-annually
Monitoring Parameters		
Ammonia, as N	mg/l	Semi-annually
Bicarbonate	mg/l	Semi-annually
Chlorides	mg/l	Semi-annually
Nitrate	mg/l	Semi-annually
Sulfates	mg/l	Semi-annually
Total Alkalinity	mg/l	Semi-annually
Total Kjeldahl Nitrogen	mg/l	Semi-annually
TDS	mg/l	Semi-annually
Inorganics (dissolved)	mg/l	Annually
VOCs	µg/l	Semi-annually
Constituents of Concern		
Table II.B.1 constituents	µg/l	Every 5 years

1. The constituent-by-constituent listings for each of the above groups are included in Attachments E and F, which accompany this Order.

IV. CORRECTIVE ACTION

A. GROUNDWATER EXTRACTION

Groundwater extraction is conducted for the purpose of both corrective action and de-watering to maintain separation from the base of the modules. The extraction well network, shown in Attachment D, is as follows:

TABLE IV.A.1
GROUNDWATER EXTRACTION WELLS

WMU	Aquifer	Purpose	Extraction Wells
1	Shallow	corrective action	EWs 1 through 8
2	Shallow	corrective action	EWs 1 through 8
3	Shallow	corrective action	EWs 1 through 8
4	Shallow	corrective action	EWs 1 through 8
5	Shallow	corrective action and de-watering	EWs 1 through 8
6	Shallow	de-watering	EWs 9 through 16

B. CORRECTIVE ACTION MONITORING

1. Monitoring Locations

The corrective action monitoring points, shown in Attachment D, are as follows:

TABLE IV.B.1
Corrective Action Monitoring Locations

Source Area	Monitoring Method	Background Wells	Shallow Wells	Deep Wells
WMU 1, 2	Intrawell[1]	OW1, OW4, OW5	OW17, OW18, OW21	PZ1, DW1, DW2
WMU 3	Intrawell	OW5, OW6	OW26, OW27	DW6
WMU 4, 5	Intrawell	OW7, OW24	EW2, EW7	DW7
WMU G[2]	Intrawell	SIMW1	OW18, SIMW4	DW2

1. Each well functions as its own background well.
2. The pond which WMU G replaced was unlined and may have impacted the vadose zone.

As of the Fourth Quarter 1999, the following wells have confirmed detections of VOCs: OW18, OW26, OW27, EW2, EW7, DW1, and DW2. Well OW7 is considered tentatively impacted. The other wells in the corrective action program have had sporadic detections of VOCs but are not considered impacted at this time.

2. Monitoring Schedule

The monitoring schedule for the corrective action wells shall be the same as for detection monitoring (see Table III.C.2).

C. SURFACE WATER MONITORING

Surface water monitoring at this facility is regulated by NPDES Order No. 98-197. The Discharger shall continue to monitor surface water, storm water, and air stripper effluent discharges for the parameters at the frequencies specified in the most current NPDES requirements. The monitoring reports shall be submitted in accordance with the NPDES compliance schedule.

D. WATER QUALITY PROTECTION STANDARD

The Water Quality Protection Standard (Standard) consists of the following elements:

1. Constituents of Concern

The 'COC list' (list of Constituents of Concern required under Title 27 shall include all constituents listed in Attachment F. The Discharger shall monitor all COCs every five years, or more frequently as required.

2. Concentration Limits

The Concentration Limit for any given Constituent of Concern or Monitoring Parameter in a given monitored medium (i.e., the uppermost aquifer) at a landfill shall be as follows, and shall be used as the basis of comparison with data from the Monitoring Points in that monitored medium:

a. The background value established in the Monitoring and Reporting Program for that constituent and medium;

b. The constituent's background value, established anew during each Reporting Period using only data from all samples collected during that Reporting Period from the Background Monitoring Points for that monitored medium. Either:

   (1) The mean (or median, as appropriate) and standard deviation (or other measure of central tendency, as appropriate) of the constituent's background data; or
   (2) The constituent's MDL, in cases where less than 10% of the background samples exceed the constituent's MDL; or

c. A concentration limit greater than background, as approved by the Board for use during or after corrective action.

The concentration limits for the unsaturated zone will be determined when sufficient data is available. The concentration limit for volatile organic compounds in the unsaturated zone is the method detection limit.

3. Monitoring Points

The groundwater monitoring points for detection monitoring shall be the monitoring locations listed in Table III.C.1. The unsaturated zone monitoring points shall consist of those lysimeters installed beneath waste management units as listed in Table III.B. All detection monitoring points are shown on Attachments C and D.

4. Points of Compliance

The point(s) of compliance at each groundwater monitoring point is the vertical surface located at the downgradient limit of the WMU that extends through the uppermost aquifer underlying the WMU. Since the WMUs are contiguous, these points correspond the corrective action and de-water wells on the northern boundary of the site as listed in Table III.C.1 and IV.B.1.

5. Compliance Period

The Compliance Period is the number of years equal to the active life of the waste management unit plus the closure period. Each time the Water Quality Protection Standard is exceeded (i.e., a release is discovered), the landfill begins a Compliance Period on the date the Board directs the Discharger to begin an Evaluation Monitoring Program. If the Discharger's Corrective Action Program (CAP) has not achieved compliance with the Standard by the scheduled end of the Compliance Period, the Compliance Period is automatically extended until the landfill has been in continuous compliance for at least three consecutive years.

The Discharger shall implement the above monitoring program on the effective date of this Order.

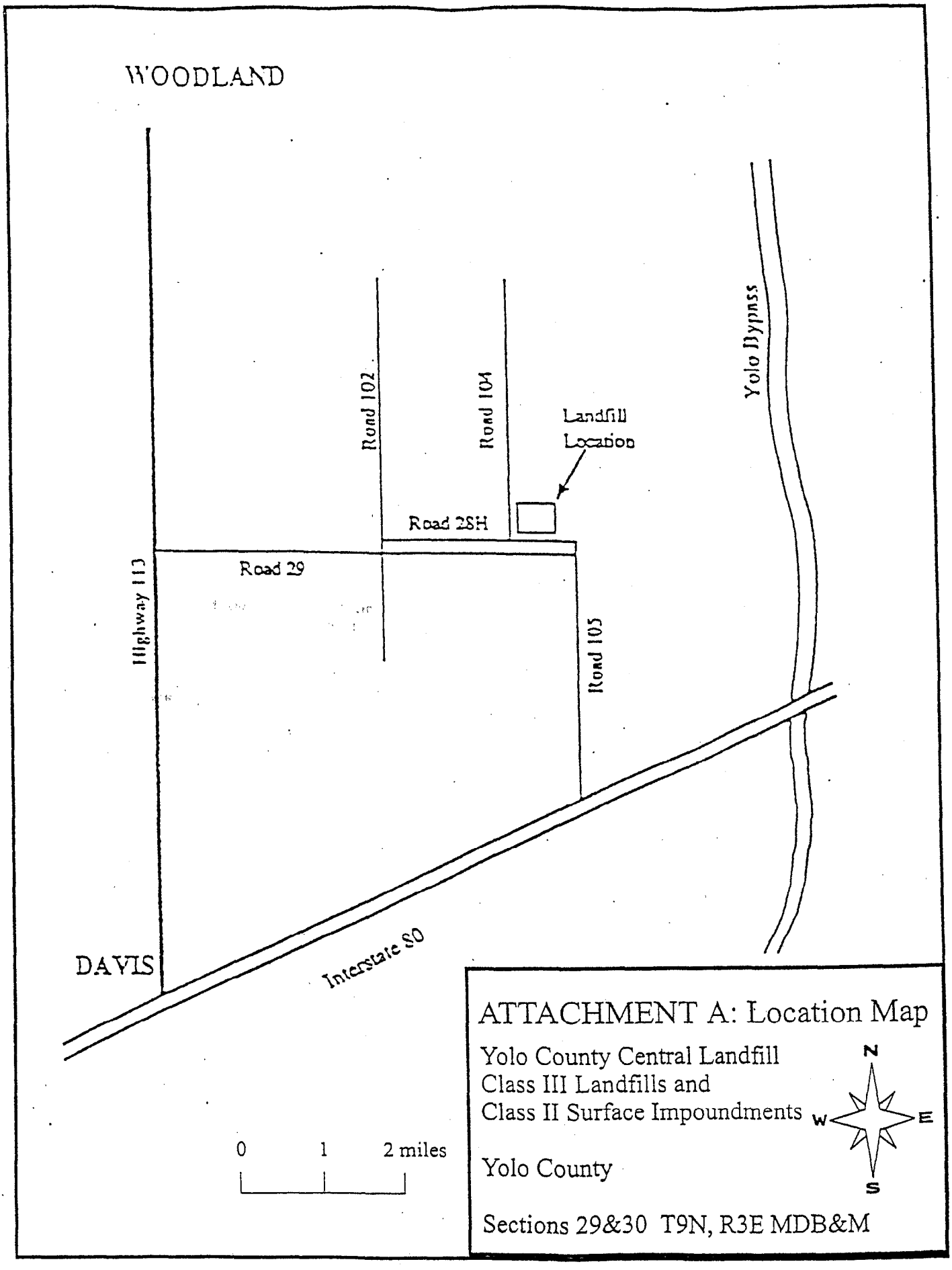
Ordered by:

GARY M. CARLTON, Executive Officer

16 June 2000

(Date)

JDM:dlk

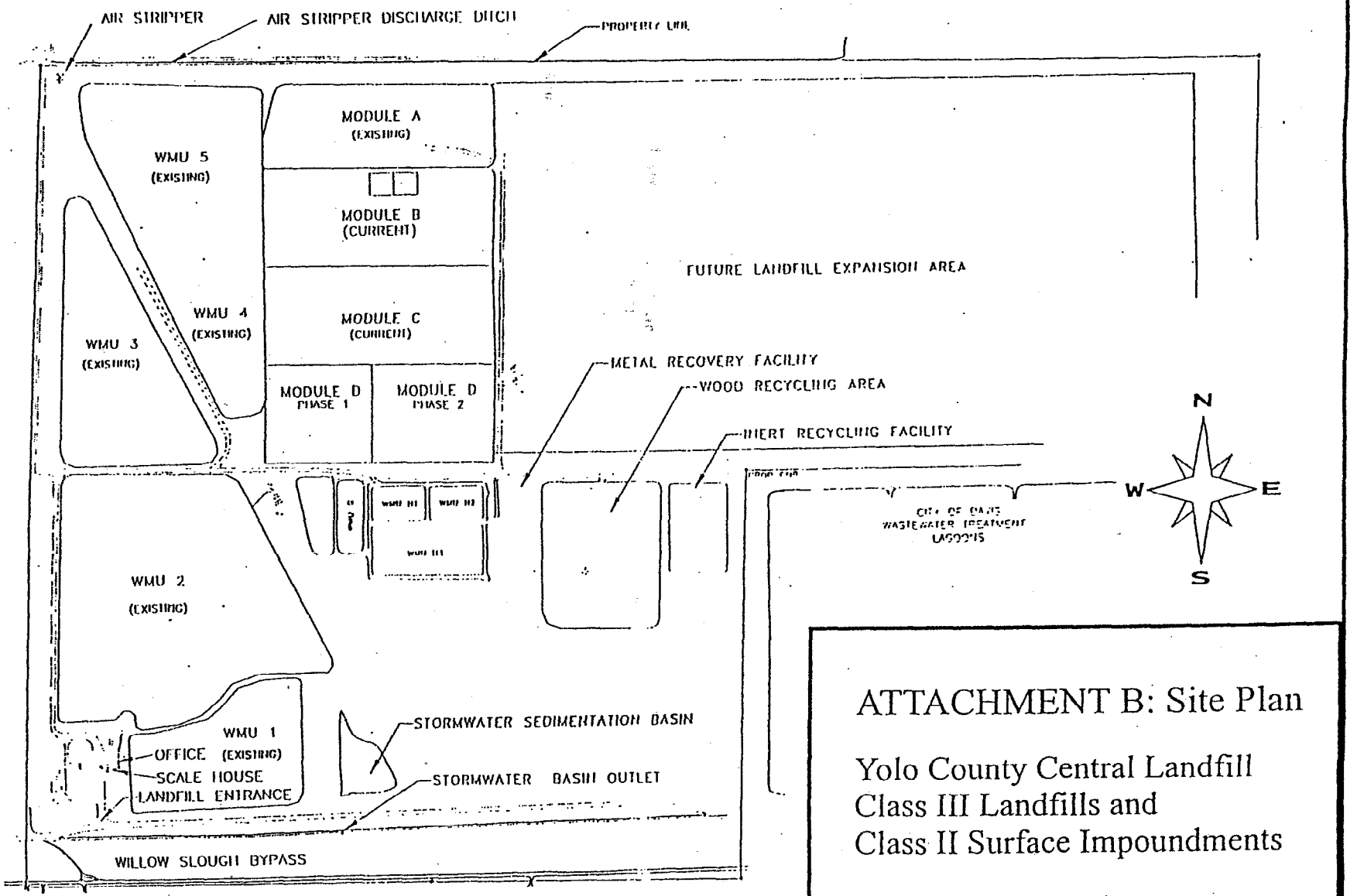


ATTACHMENT A: Location Map

Yolo County Central Landfill
Class III Landfills and
Class II Surface Impoundments

Yolo County

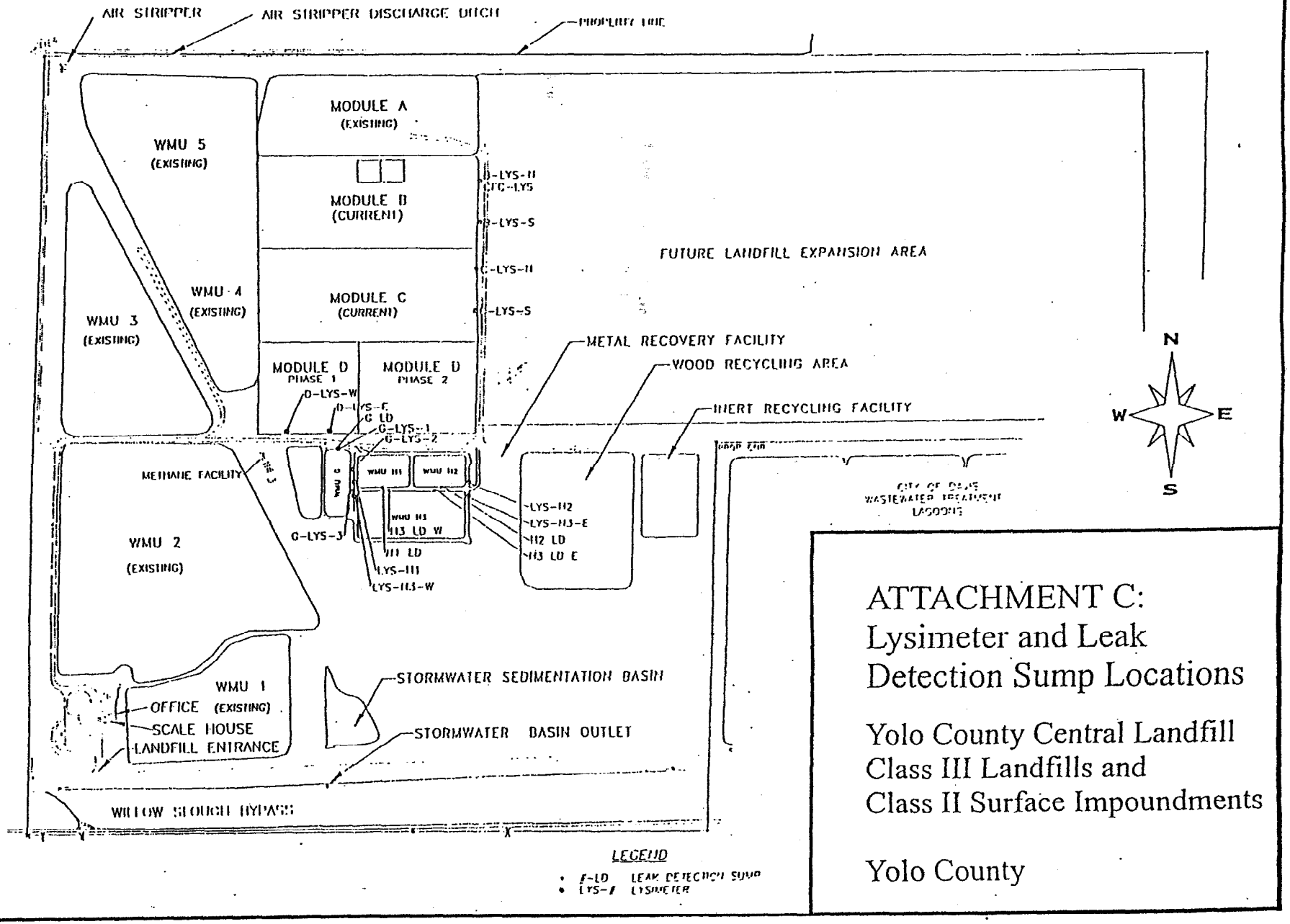
Sections 29&30 T9N, R3E MDB&M



ATTACHMENT B: Site Plan

Yolo County Central Landfill
Class III Landfills and
Class II Surface Impoundments

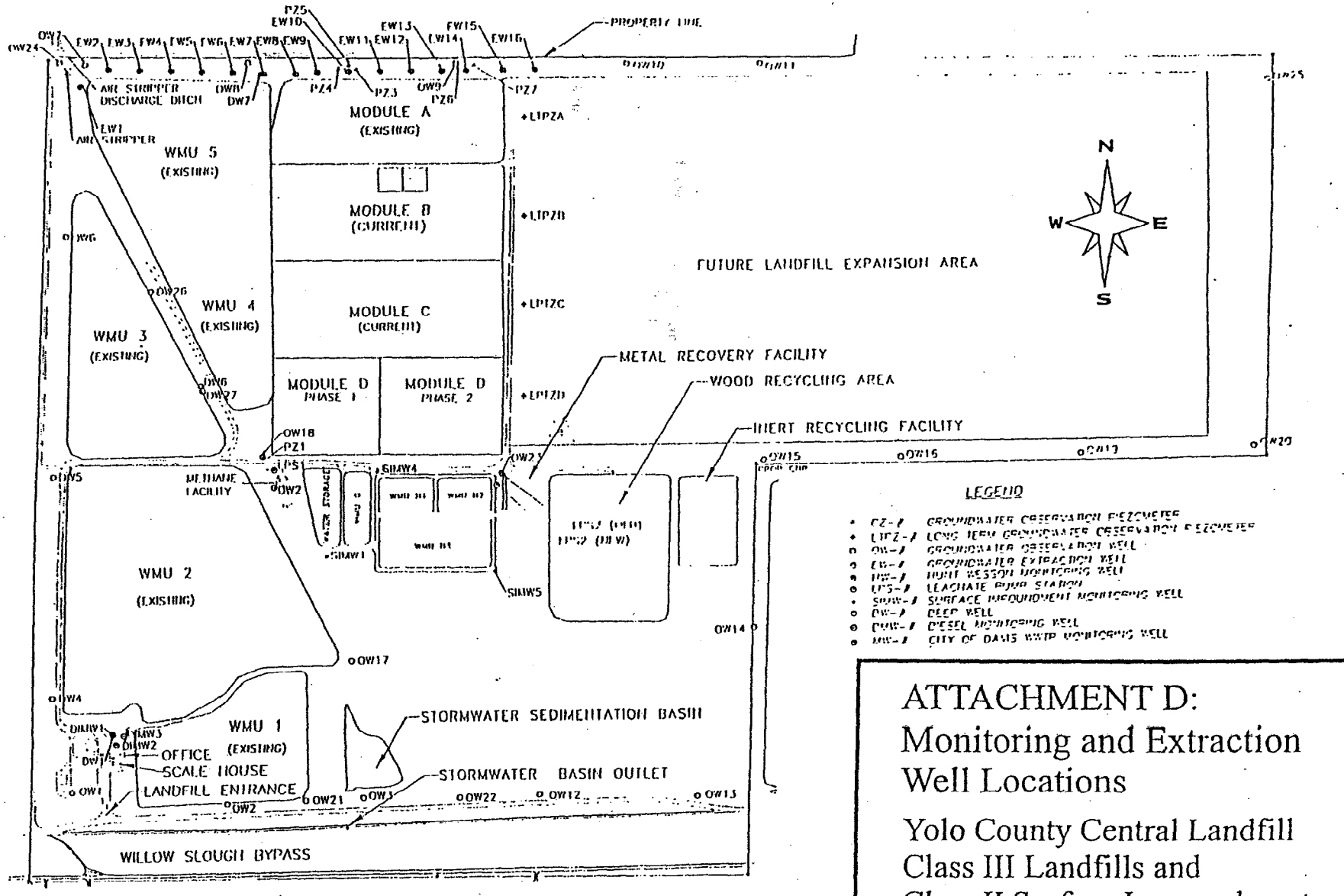
Yolo County



ATTACHMENT C: Lysimeter and Leak Detection Sump Locations

Yolo County Central Landfill
Class III Landfills and
Class II Surface Impoundments

Yolo County



ATTACHMENT D:
Monitoring and Extraction Well Locations

Yolo County Central Landfill
Class III Landfills and
Class II Surface Impoundments
Yolo County

ATTACHMENT E

MONITORING PARAMETERS &
APPROVED USEPA ANALYTICAL METHODS

General

pH
Specific conductance
Total Alkalinity
Ammonia as N
Total Kjeldahl Nitrogen
Nitrate
Bicarbonate
Chlorides
Sulfates
Total Dissolved Solids

Inorganics[1]	USEPA Method:
Cobalt	6010
Copper	6010
Iron	6010
Manganese	6010
Vanadium	6010
Zinc	6010
Nickel	7520
Potassium	6010

1. Leachate, groundwater, and unsaturated zone samples shall be analyzed and reported as dissolved

Volatile Organic Compounds (VOCs)[1] (by USEPA Method 8260):

Acetone
Acrylonitrile
Benzene
Bromochloromethane
Bromodichloromethane
Bromoform (Tribromomethane)
Carbon disulfide
Carbon tetrachloride
Chlorobenzene
Chloroethane (Ethyl chloride)
Chloroform (Trichloromethane)

ATTACHMENT E (CON'T)

Dibromochloromethane (Chlorodibromomethane)
1,2-Dibromo-3-chloropropane (DBCP)
1,2-Dibromoethane (Ethylene dibromide; EDB)
o-Dichlorobenzene (1,2-Dichlorobenzene)
p-Dichlorobenzene (1,4-Dichlorobenzene)
trans- 1,4-Dichloro-2-butene
1,1-Dichloroethane (Ethylidene chloride)
1,2-Dichloroethane (Ethylene dichloride)
1,1-Dichloroethylene (1,1-Dichloroethene; Vinylidene chloride)
cis-1,2-Dichloroethylene (cis- 1,2-Dichloroethene)
trans-1,2-Dichloroethylene (trans-1,2-Dichloroethene)
1,2-Dichloropropane (Propylene dichloride)
cis-1,3-Dichloropropene
trans-1,3-Dichloropropene
Ethylbenzene
2-Hexanone (Methyl butyl ketone)
Methyl bromide (Bromomethene)
Methyl chloride (Chloromethane)
Methylene bromide (Dibromomethane)
Methylene chloride (Dichloromethane)
Methyl ethyl ketone (MEK; 2-Butanone)
Methyl iodide (Iodomethane)
Methyl tert-butyl ether (MTBE)
4-Methyl-2-pentanone (Methyl isobutylketone)
Styrene
1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
Tetrachloroethylene (Tetrachloroethene; Perchloroethylene)
Toluene
1,1,1-Trichloethane (Methylchloroform)
1,1,2-Trichloroethane
Trichloroethylene (Trichloroethene)
Trichlorofluoromethane (CFC-11)
1,2,3-Trichloropropane
Vinyl acetate
Vinyl chloride
Xylenes

1. Report all peaks identified by the EPA test methods.

ATTACHMENT F

CONSTITUENTS OF CONCERN & APPROVED USEPA ANALYTICAL METHODS

General

pH
Specific conductance
Total Alkalinity
Ammonia as N
Total Kjeldahl Nitrogen
Nitrate
Bicarbonate
Carbonate
Chlorides
Calcium
Magnesium
Potassium
Sodium
Sulfates
Total Dissolved Solids

Inorganics[1]	USEPA Method:
Aluminum	6010
Antimony	6010
Barium	6010
Beryllium	6010
Cadmium	6010
Chromium	6010
Chromium VI^{+}	7197
Cobalt	6010
Copper	6010
Iron	6010
Manganese	6010
Silver	6010
Tin	6010
Vanadium	6010
Zinc	6010
Arsenic	7061
Lead	7421
Mercury	7470
Nickel	7520
Selenium	7741

ATTACHMENT F (CON'T)

Thallium	7841
Cyanide	9010
Sulfide	9030

1. Leachate, groundwater, and unsaturated zone samples shall be analyzed and reported as dissolved

Volatile Organics (USEPA Method 8260):

Acetone
Acetonitrile (Methyl cyanide)
Acrolein
Acrylonitrile
Allyl chloride (3-Chloropropene)
Benzene
Bis(2-ethylhexyl) phthalate
Bromochloromethane (Chlorobromomethane)
Bromodichloromethane (Dibromochloromethane)
Bromoform (Tribromomethane)
Carbon disulfide
Carbon tetrachloride
Chlorobenzene
Chloroethane (Ethyl chloride)
Chloroform (Trichloromethane)
Chloroprene
Dibromochloromethane (Chlorodibromomethane)
1,2-Dibromo-3-chloropropane (DBCP)
1,2-Dibromoethane (Ethylene dribromide; EDB)
o-Dichlorobenzene (1,2-Dichlorobenzene)
m-Dichlorobenzene (1,3-Dichlorobenzene)
p-Dichlorobenzene (1,4-Dichlorobenzene)
trans- 1,4-Dichloro-2-butene
Dichlorodifluoromethane (CFC 12)
1,1-Dichloroethane (Ethylidene chloride)
1,2-Dichloroethane (Ethylene dichloride)
1,1-Dichloroethylene (1,1-Dichloroethene; Vinylidene chloride)
cis- 1,2-Dichloroethylene (cis- 1,2-Dichloroethene)
trans- 1,2-Dichloroethylene (trans- 1,2-Dichloroethene)
1,2-Dichloropropane (Propylene dichloride)
1,3-Dichloropropane (Trimethylene dichloride)
2,2-Dichloropropane (Isopropylidene chloride)
1,1 -Dichloropropene
cis- 1 ,3-Dichloropropene
trans- 1,3-Dichloropropene
Ethylbenzene

ATTACHMENT F (CON'T)

Hexachlorobutadiene
2-Hexanone (Methyl butyl ketone)
Isobutyl alcohol
Isodrin
Methacrylonitrile
Methyl bromide (Bromomethane)
Methyl chloride (Chloromethane)
Methyl ethyl ketone (MEK; 2-Butanone)
Methyl iodide (Iodomethane)
Methyl methacrylate
Methyl tert-butyl ether (MTBE)
4-Methyl-2-pentanone (Methyl isobutyl ketone)
Methylene bromide (Dibromomethane)
Methylene chloride (Dichloromethane)
Naphthalene
Propionitrile (Ethyl cyanide)
Styrene
1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
Tetrachloroethylene (Tetrachloroethene; Perchloroethylene; PCE)
Toluene
1,2,4-Trichlorobenzene
1,1,1-Trichloroethane, Methylchloroform
1,1,2-Trichloroethane
Trichloroethylene (Trichloroethene; TCE)
Trichlorofluoromethane (CFC- 11)
1,2,3-Trichloropropane
Vinyl acetate
Vinyl chloride (Chloroethene)
Xylene (total)

Semivolatile Organics (USEPA Method 8270 - base, neutral, & acid extractables):

Acenaphthene
Acenaphthylene
Acetophenone
2-Acetylaminofluorene (2-AAF)
Aldrin
4-Aminobiphenyl
Anthracene
Benzo[a]anthracene (Benzanthracene)
Benzo[b]fluoranthene
Benzo[k]fluoranthene

ATTACHMENT F (CON'T)

Benzo[g,h,i]perylene
Benzo[a]pyrene
Benzyl alcohol
alpha-BHC
beta-BHC
delta-BHC
gamma-BHC (Lindane)
Bis(2-chloroethoxy)methane
Bis(2-chloroethyl) ether (Dichloroethyl ether)
Bis(2-chloro-1-methyethyl) ether (Bis(2-chloroisopropyl) ether; DCIP)
4-Bromophenyl phenyl ether
Butyl benzyl phthalate (Benzyl butyl phthalate)
Chlordane
p-Chloroaniline
Chlorobenzilate
p-Chloro-m-cresol (4-Chloro-3-methylphenol)
2-Chloronaphthalene
2-Chlorophenol
4-Chlorophenyl phenyl ether
Chrysene
o-Cresol (2-methylphenol)
m-Cresol (3-methylphenol)
p-Cresol (4-methylphenol)
4,4'-DDD
4,4'-DDE
4,4'-DDT
Diallate
Dibenz[a,h]anthracene
Dibenzofuran
Di-n-butyl phthalate
o-Dichlorobenzene (1,2-Dichlorobenzene)
m-Dichlorobenzene (1,3-Dichlorobenzene)
p-Dichlorobenzene (1,4-Dichlorobenzene)
3,3'-Dichlorobenzidine
2,4-Dichlorophenol
2,6-Dichlorophenol
Dieldrin
Diethyl phthalate
p-(Dimethylamino)azobenzene
7,12-Dimethylbenz[a]anthracene
3,3'-Dimethylbenzidine
2,4-Dimehtylphenol (m-Xylenol)

ATTACHMENT F (CON'T)

Dimethyl phthalate
m-Dinitrobenzene
4,6-Dinitro-o-cresol (4,6-Dinitro-2-methylphenol)
2,4-Dinitrophenol
2,4-Dinitrotoluene
2,6-Dinitrotoluene
Di-n-octyl phthalate
Diphenylamine
Endosulfan I
Endosulfan II
Endosulfan sulfate
Endrin
Endrin aldehyde
Ethyl methacrylate
Ethyl methanesulfonate
Famphur
Fluoranthene
Fluorene
Heptachlor
Heptachlor epoxide
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Hexachloropropene
Indeno(1,2,3-c,d)pyrene
Isophorone
Isosafrole
Kepone
Methapyrilene
Methoxychlor
3-Methylcholanthrene
Methyl methanesulfonate
2-Methylnaphthalene
Naphthalene
1,4-Naphthoquinone
1-Naphthylamine
2-Naphthylamine
o-Nitroaniline (2-Nitroaniline)
m-Nitroaniline (3-Nitroaniline)
p-Nitroaniline (4-Nitroaniline)
Nitrobenzene

ATTACHMENT F (CON'T)

o-Nitrophenol (2-Nitrophenol)
p-Nitrophenol (4-Nitrophenol)
N-Nitrosodi-n-butylamine (Di-n-butylnitrosamine)
N-Nitrosodiethylamine (Diethylnitrosamine)
N-Nitrosodimethylamine (Dimethylnitrosamine)
N-Nitrosodiphenylamine (Diphenylnitrosamine)
N-Nitrosodipropylamine (N-Nitroso-N-dipropylamine; Di-n-propylnitrosamine)
N-Nitrosomethylethylamine (Methylethylnitrosamine)
N-Nitrosopiperidine
N-Nitrosospyrrolidine
5-Nitro-o-toluidine
Pentachlorobenzene
Pentachloronitrobenzene (PCNB)
Pentachlorophenol
Phenacetin
Phenanthrene
Phenol
p-Phenylenediamine
Polychlorinated biphenyls (PCBs; Aroclors)
Pronamide
Pyrene
Safrole
1,2,4,5-Tetrachlorobenzene
2,3,4,6-Tetrachlorophenol
o-Toluidine
Toxaphene
1,2,4-Trichlorobenzene
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
0,0,0-Triethyl phosphorothioate
sym-Trinitrobenzene

Organophosphorus Pesticides (USEPA Method 8141A):
0,0-Diethyl 0-2-pyrazinyl phosphorothioate (Thionazin)
Dimethoate
Disulfoton
Methyl parathion (Parathion methyl)
Parathion
Phorate

Chlorinated Herbicides (USEPA Method 8151):
2,4-D (2,4-Dichlorophenoxyacetic acid)

ATTACHMENT F (CON'T)

Dinoseb (DNBP; 2-sec-Butyl-4,6-dinitrophenol)
Silvex (2,4,5-Trichlorophenoxypropionic acid; 2,4,5-TP)
2,4,5-T (2,4,5-Trichlorophenoxyacetic acid)

Organochlorine Pesticides (USEPA Method 8081A)

Aldrin
BHCs
Chlordane
4,4'-DDD
4,4'-DDE
4,4'-DDT
Dieldrin
Endosulfan I
Endosulfan II
Endosulfan sulfate
Endrin
Endrin aldehyde
Heptachlor
Heptachlor epoxide
Lindane
Methoxychlor
Toxaphene

PCBs (USEPA Method 8082)

PCB-1016
PCB-1221
PCB-1232
PCB-1242
PCB-1248
PCB-1254
PCB-1260

INFORMATION SHEET

ORDER NO. 5-00-134
YOLO COUNTY DEPARTMENT OF PLANNING AND PUBLIC WORKS
YOLO COUNTY CENTRAL LANDFILL
CLASS III LANDFILLS AND CLASS II SURFACE IMPOUNDMENTS
YOLO COUNTY

Background

The waste disposal facilities include six Class III landfills, four Class II surface impoundments, and a bioreactor demonstration project. Other landfill facilities include borrow areas for module construction, a ground water extraction and treatment system, storm water drainage ditches and a storm water retention pond, a supply water storage pond, two leachate pump stations, gas extraction facilities, pipelines, and an onsite power plant for co-generation of electricity. Diversion facilities include a materials recycling area, a household hazardous waste collection area, and a wood/yard-waste facility.

There are currently 63 ground water monitoring wells at the facility, including 43 shallow observation wells, 15 extraction wells (EWs 1 through 14, and EW16), and five deep wells (DWs-1, 2, 6 and 7, and PZ1). The shallow observation wells are OWs 1 through 28, SIMWs 1, 4, and 5, LPTZs A, B, C, and D, PZs 3 through 7, and DIMWs 1, 2, and 3. As described in the WDRs, the ground water on the western part of the site is impacted by VOCs from the older landfill units. Elevated levels of inorganic constituents appear to be from offsite irrigation activities. The Discharger is also conducting an investigation to determine the source of benzene and MTBE detected in the shallow ground water, per Cleanup and Abatement Order No. 99-719.

The existing onsite surface water drainage facilities include perimeter ditches at all WMUs and one storm water retention basin. The storm water retention basin volume is approximately 29 acre-feet. A 24-inch-diameter reinforced concrete pipe outlet allows flows in the basin to discharge by gravity to the Willow Slough Bypass (located at the south site boundary). A gate on the downstream end of the pipe prevents high water flows in Willow Slough Bypass from flowing into the basin. The facility has obtained coverage under the General Industrial Storm Water Permit for storm water discharges. The permit applies to direct storm water discharges and storm water discharges from the sedimentation basins.

Leachate Handling

WMUs 1 through 4 are constructed on compacted sub-grade, which has been graded for leachate runoff. A perimeter trench captures leachate runoff from these units and conveys it to a trunk line to Pump Station No. 1. Since the trench is below grade, it may also be capturing ground water when ground water is high. Since these units are unlined and do not have an LCRS, any leachate that does not runoff to the perimeter drains has the potential to percolate to ground water and impact ground water. WMU H is plumbed to Pump Stations No. 1 and 2, and WMU 6D. Leachate from the WMU 6D sumps is directly pumped to the surface impoundments WMUs G and H. The impoundments will be used to store landfill leachate during the wet season and evaporate it during the dry season. The large

pond is equipped with spray and drip facilities to enhance evaporation. Pump station No.1 collects leachate from WMUs 1 through 5. Pump Station No. 2 collects leachate from WMU 6A, 6B, and 6C.

In previous years, landfill leachate was temporarily stored onsite (in WMU G) and then piped to the City of Davis Wastewater Treatment Plant (WTP) adjacent to the landfill. In May 1998, as a result of sampling required by the City WTP, the Discharger detected low levels of dioxins and furans in the leachate. The City refused to accept any more of the leachate without pre-treatment to remove the dioxins. Discharger subsequently opted for construction of large onsite surface impoundments as the most practicable long-term disposal alternative. However, unable to develop a economically practicable short-term treatment or disposal alternative, and with WMU G full, the Discharger shut off the leachate pump stations in December 1999, allowing leachate to build up in the landfill. Some of the leachate was also used for dust control. Staff subsequently issued two Notices of Violation and in June 1999 the Executive Officer issued Cleanup and Abatement Order No. 99-719, requiring the Discharger to investigate the impacts of the unauthorized discharge. The CAO also required the Discharger to evaluate short-term treatment/disposal alternatives and included a deadline for construction and start-up of WMU H. The Discharger subsequently used a batch treatment process to remove dioxins from the leachate in WMU G, and the City WTP accepted the treated leachate, allowing them to draw down WMU G enough to provide enough storage capacity through construction of WMU H.

Pilot Bioreactor Project

A "bioreactor" is a filled/closed landfill unit in which leachate and or other liquid is injected to accelerate the bacterial decomposition wastes and production of methane gas. Among the purported benefits of bioreactors are rapid recovery of landfill air space, reduced long term risk to the environment, and co-generation of electricity from landfill gas. Since 1996, the Discharger has been conducting a small pilot bioreactor project at Module B to demonstrate bioreactor technology. The project consists of an anaerobic bioreactor (referred to as the "enhanced cell"), and a conventional dry landfill cell (referred to as the "control cell") for comparison purposes.

During waste placement, instrumentation was placed at various levels within the cells to monitor temperature , moisture, pressure and other process conditions. The pressure transducer was placed in the LCRS to measure hydrostatic head on the LCRS. A water injection manifold and gas recovery wells were placed within a layer of shredded tires in the upper portion of the enhanced cell. Each cell was then covered with 40-mil low-density polyethylene (LDPE) liner anchored into the clay perimeter wall.

At start-up in 1996, supplemental liquid consisting of extracted ground water was injected into the bioreactor to help moisten the waste mass and accelerate leachate production. Leachate generation began within a few days and was then recirculated back into the cell along with the supplemental liquid. Both types of liquid additions were separately metered. Approximately 378,000 gallons of supplemental liquid was injected into the bioreactor (about 40 to 50 gallons per ton of waste) before supplemental liquid injection was stopped (about three months after start-up). The sustained peak injection rate was 10 gallons per minute (gpm) corresponding to a rate of 44 gpm per acre. The peak leachate production rate occurred during liquid injection and was 47% of the liquid injection rate.

Leachate re-circulation was continued, however, and the moisture sensors were monitored to determine when field capacity (ie. moisture holding capacity of the waste mass) was reached.

In December 1998 leachate recirculation was stopped. As of May 1999, the moisture level of the waste was about 48% and leachate production was significantly reduced. While the project is still in operation, the results to date show significantly higher waste settlement and methane gas production in the enhanced cell compared to the control cell, indicating that the organic wastes in the enhanced cell have decomposed at a higher rate than those in the dry cell. The pilot project is still producing methane.

Proposed Full-Scale Project

As a follow-up to the pilot bioreactor project, the Discharger is proposing to operate a full-scale bioreactor demonstration project at Module D. The project will consist of two bioreactor cells – one anaerobic and the other aerobic. Each bioreactor will cover up to six acres on the west half of the Module D area. As with the pilot project, instrumentation will be placed in bioreactors to monitor moisture levels and other process parameters. The information will also be used to adjust liquid injection levels as necessary to stay below the moisture holding capacity of the waste mass. The bioreactors will utilize the existing containment system for Module D, including Subtitle D liner, underlying engineered fill (compacted clay) and capillary break layer. Pressure transducers will be placed on the liner and in the LCRS trenches to monitor head on the liner to ensure that leachate levels do not exceed design criteria. The capillary break layer will be separately monitored through pan lysimeter sumps with lateral drains underneath the base liner. These WDRs require that the Discharger not exceed the moisture holding capacity of the landfill, as defined in Title 27. The WDRs also require that the Discharger obtain a waiver from the USEPA regarding the restrictions on liquid additions to Subtitle D landfills contained in 40 CFR 258.28 before adding certain supplemental liquids to the bioreactor.